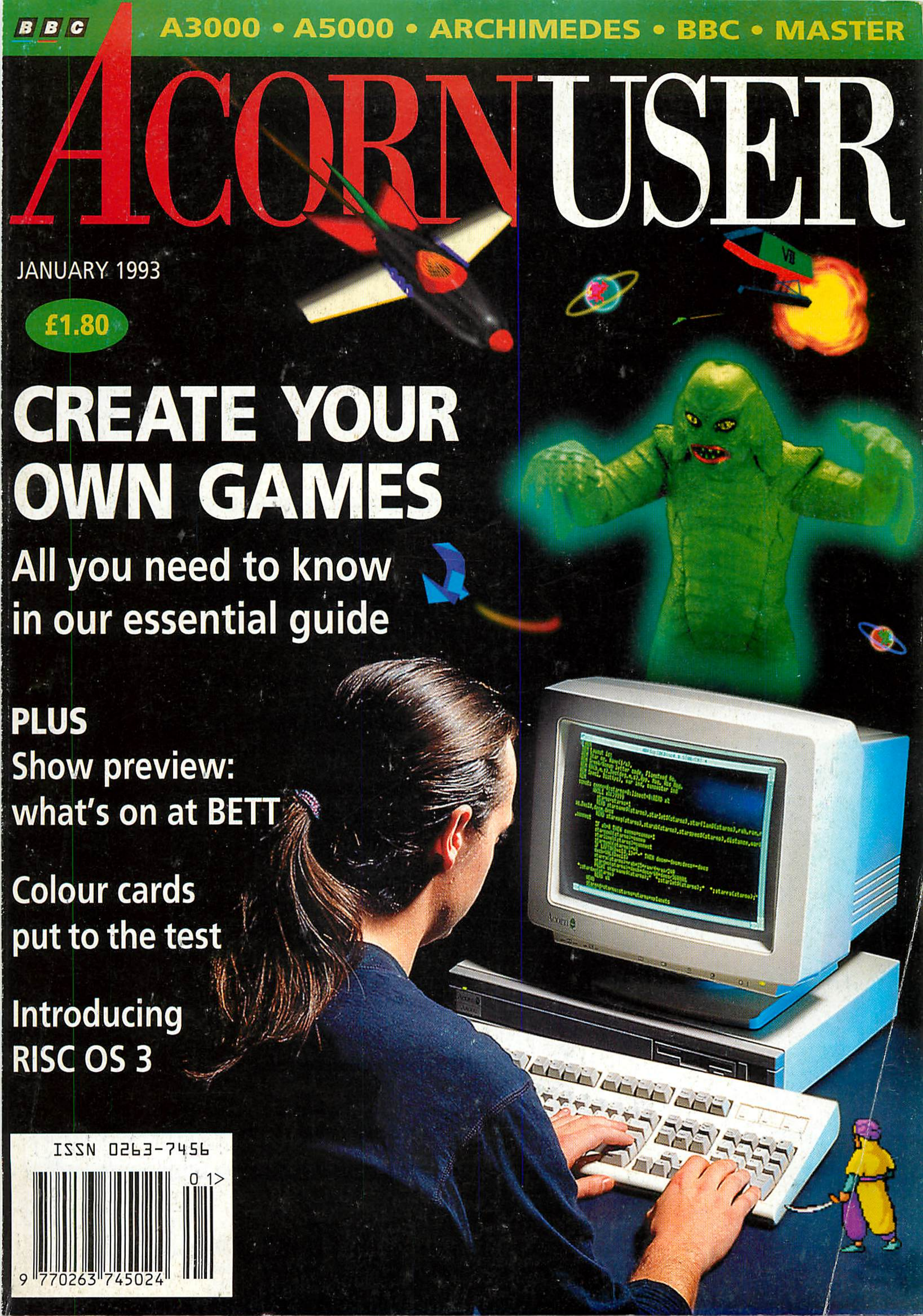


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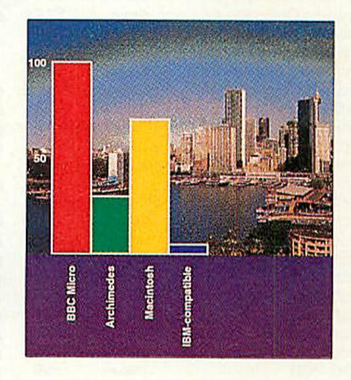
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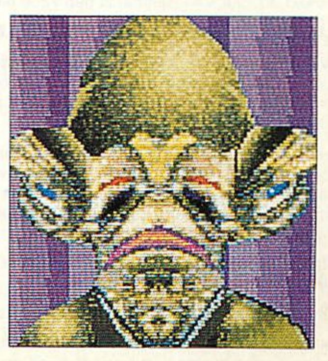
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A5000 2MB HD80 Multiscan Acorn £1395
– as above + Learning Curve £1455
Pocket Book Acorn £212

MISCELLANEOUS . . .

386 PC Expansion Card 25 MHz Aleph One
– 1 Mb £374•
– 4 Mb £468•
486 PC Expansion Card Aleph One
– 1 Mb £463•
– 4 Mb £557•
4-slot 4-layer Backplane IFEL £57•
9060S Monitor Eizo £450
A300/400 Fan kit ICS £15
A310 RISC OS Carrier Board ‡ IFEL £18•
A5000 Fitting Kit for second hard disc ICS £15
Arckey Function KeyStrip Holder ICS VO £3
– pack of 4 VO £10
ArcNET ACS £69•
ARM3 ‡ Aleph One/IFEL £175•
ColourCard CC £238•
Dongle Dangle with screw fittings ICS £6
Fan filters (pack of 10) (not A5000) ICS £6
FaxPack CC £289
Floppy Discs, 10 × 3½" High Density £10
G8 Plus State £248•
G8 Professional State £348•
HiPoint Mouse for A4 Genius £49
Micro Mouse Clares £26
Monitor Stand for A3000 ICS £21
Podule Case for A3000 £16
RISC OS 3 Upgrade Acorn £41
– Bulk package Acorn £335
– A5000 Acorn £17
Seal 'n Type spill-proof Keyboard Covers
– Archimedes / A5000 Kador £14
– A3000 Kador £14
TouchWindow Lindis £234
Whisper Fan Quietener (for A300/A400 series only) ICS £15

I²C PRODUCTS . . .

AnDi Oddule Baildon **£30**

I²C Adaptor (needed unless you already have an I²C socket) Baildon £10
I²C SWI (enhanced IIC_Control) Baildon £15
– bought with Oddule £5



MEMORY . . .

Fitting extra unless otherwise stated
† Fitting easy ‡ Fitting needs expertise

A3000 2 Mb Non-upgradable † IFEL £41•
A3000 2 Mb Upgradable † IFEL £45•
A3000 4 Mb † Atomwide/IFEL £110•
A3010 1-2 Mb £49
A310 2 Mb Upgradable soldered ‡ IFEL £88•
– as above + MEMC1a £124•
– as above + MEMC1a + fitting £154•
A310 4 Mb soldered + MEMC1a ‡ IFEL £180•
– as above + fitting £210•
A5000 2-4 Mb Non-upgradable † Atomwide £85
A5000 2-4 Mb Upgradable † IFEL £85•
A5000 2-8 Mb including fitting Atomwide £500
A5000 4-8 Mb including fitting Atomwide £391
A540 4 Mb † Atomwide £238

PRINTERS . . .

ArcLaser 300-6 Calligraph £895
ArcServer 300-8 Calligraph £985
Bubble Jet BJ-10ex Canon £187
Bubble Jet BJ-10ex + TurboDriver Canon/CC £219•
Bubble Jet BJ-20 Canon £255
Bubble Jet BJ-300 Canon £299
Bubble Jet BJ-330 Canon £405
Bubble Jet BJC-800 + TurboDriver Canon/CC £1499
DeskJet 500 Hewlett-Packard £299•
DeskJet 500C Hewlett-Packard £375•
DeskJet 550 Hewlett-Packard £475•
Laser Direct HiRes4 with 50-sheet tray CC £899
– 250-sheet Paper Cassette £99
Laser Direct HiRes8 CC £1280
Laser Direct LBP-4 Card CC £325
LBP-4 Canon £659
Refill toner cartridge for Canon EPS £50
New toner cartridge for Canon LBP-4 £59

SCANNERS, DIGITISERS . . .

ArcScanner including Epson GT-4000 Clares £1660
Colour Converter Lindis £145
FaxScan Spacetech £94
Hawk V9 Wild Vision £199
– A3000 version Wild Vision £278
iImage (Sharp JX-100) Irlam
– for A5000 £490
– for other computers £589
Image Scanner Iota £383
– Colour upgrade Iota £148
– Fast parallel card Iota £98
– Lighting unit Iota £91
i-Scan 200 Irlam £539
i-Scan 400 Irlam £589
Pineapple Colour Video Digitiser Pineapple £195
– A3000 boxed Pineapple £230
ProImage (Epson GT6000) Irlam
– for A5000 £989
– for other computers £1089
Scan-Light A4 CC £277
– with Sheet Feeder CC £360
Scan-Light 256 CC £190
– A3000 internal CC £190
Scan-Light Professional CC £565
– as above + SCSI interface CC £699
SnapShot Colour Video Digitiser Lingenuity £195
– A3000 version Lingenuity £275
Spectra RISC £545
– A3000 Internal RISC £545
– A3000 External RISC £565
Vision Digitiser HCCS
– Mono £47
– Colour £79
– A3000 External Mono £62
– A3000 External Colour £92
– A3000 Internal Mono £49
– A3000 Internal Colour £79

SEE US AT THE BETT SHOW – OLYMPIA – 20TH-23RD JANUARY



AUTHORISED ACORN DEALER

ICS (Ian Copestake Limited)

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Tel: 051-625 1006 Fax: 051-625 1007

E&OE D61 92NO19

LICENSED CREDIT BROKER



ideA

ideA'92 is the name of a new generation of IDE interface cards from ICS, fully compatible with RISC OS 2, 3 and 3.1. Unlike other makes, Internal Hard Disc Upgrades from ICS will fit neatly inside the new A3000 Series computers.

With **background mode** operation, even our 8-bit A3000 Series internal interface is producing speeds in excess of 1 Mb/sec with certain hard discs. 1.6 Mb/sec is possible with our 16-bit interfaces. Compare that with the competition!

Not one, not two, but three levels of **password protection** provide the security your data really deserve.

Hard discs can have **partitions** so they appear as separate drives, with different protection levels if required.

Almost **limitless expansion** is possible via the I²C port which most of our cards have always included as standard.

CALL FOR LATEST CHRISTMAS PRICES

A3000 Series Internal 2½" Upgrade* or A300/400/500 2½" 'Hard Card'*	20 Mb	£2[illegible]
*These are different products – please specify which you require	60 Mb	£349
	80 Mb	£449
	120 Mb	£549
A300/400/500 3½" Internal Upgrade	40 Mb	£210
	80 Mb	£275
	100 Mb	£305
	200 Mb	£499
	340 Mb	£775

A very special offer from ICS!

A3010 'Family Solution' + 20 Mb Hard Disc	£599
As above with 2 Mb ram	£645

ICS has always led the field in IDE systems for Acorn computers. You can buy our products with confidence, either direct from us or from any Acorn dealer who values quality as well as price. The above examples of our range are all available as this goes to press, and include all the *ideA'92* features. External options are also available, but may not yet include all the features described. Please contact us for the latest information.

Prices are for complete upgrade kits and exclude VAT. Carriage is free on UK prepaid orders.

ICS (Ian Copestake Limited)
Dept B38, 1 Kington road, West Kirby, WIRRAL, Merseyside, L48 5ET
Tel: 051-625 1006 Fax: 051-625 1007



IMPORTANT NOTICE If you have version 2.5x of our IDEFS, please telephone 0274 580519 for some important news. To see which version you have, type Help IDEFS at the command line. If it starts with 2.5, call us now.



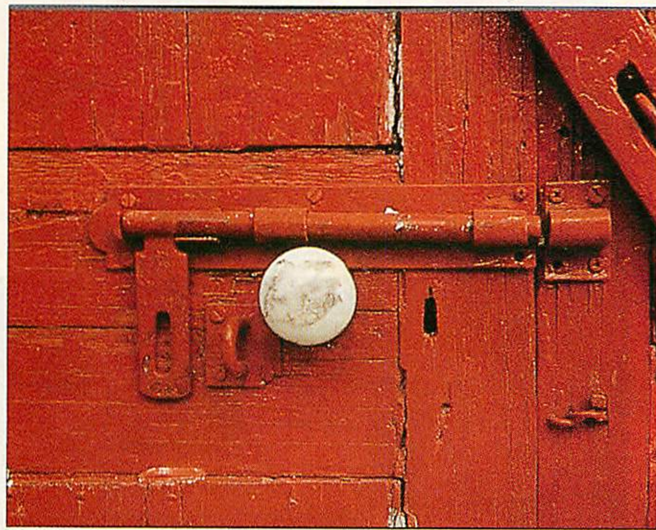
ACORN GOES FOR PHOTO CD

ACORN is set to sign a licence to develop Kodak Photo CD compatible products. Photo CD is a standard which enables 5in compact discs to store over 100 high-quality colour images taken from standard colour film.

A service is now available for members of the public to have their photos transferred to a Photo CD at the time of processing. Photo CD images can be dry-printed using thermal techniques with results that are virtually indistinguishable from those produced using the traditional chemical printing process.

The Photo CD format is ideal for computer image storage libraries. Computer Concepts used a selection of Photo CD images to demonstrate its new Colour Card at the *BBC Acorn User* show last October.

Kodak is promoting the Photo CD in both commercial and consumer markets and the special Photo CD players are available to display images on a domestic TV. Selected CD-Rom drives are now Photo CD compatible devices; look out for the term 'multi-session' compatible.



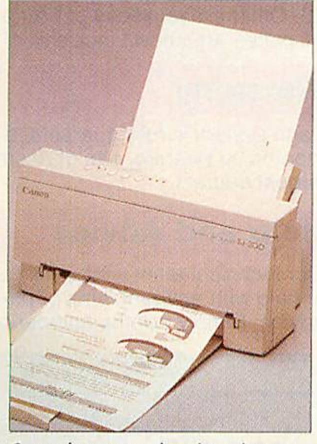
Kodak's Photo CD: near photographic quality from a compact disc

Acorn's technical director, Malcolm Bird, told *BAU* that, 'Photo CD will be an extremely important resource in the education market'. A Kodak spokesman told *BAU* that a deal with Acorn would be signed shortly.

FAST CANON FROM CC

A SECOND-GENERATION bubblejet printer has been announced by Canon. The new BJ200 uses a 16-bit processor to speed up character-based printing modes. It can print at around three pages per minute in draft mode. The print head has been improved for speed and quality.

Unlike the popular BJ10ex, the BJ200 isn't meant to be portable. The power supply unit is built in as is a cutsheet feeder. An upright configuration reduces the BJ200's desktop 'footprint'.



Canon has souped up its printers

Computer Concepts has adapted its BJ *TurboDrivers* to work with the new Canon. CC reports that full pages with outline fonts and graphics, produced by applications like *Impression*, take around a minute to print, three times faster than a BJ10ex. Canon's recommended price for the BJ200 is £399+VAT, but CC intends to supply the printer with *TurboDrivers* for £299+VAT.

● Two more new printers from Canon this month are the BJC-880 colour bubblejet and the 600dpi LBP-8 IV. The BJC-880 uses Canon's CaPSL page description language and will be available in the spring for between £3,000 and £4,000.

The LBP-8 IV is Canon's first true 600dpi laser printer. The LBP-8 IV starts at a recommended price of £1649+VAT. For more information, contact Canon UK on 081-773 3173.

SOFT SELL

A NOVEL way of distributing software has been adopted by Swindon-based Circle Software. With the launch of Circle's new *Impact!* database package, the company has introduced self-modifying software. The idea is that a demonstration copy of the software is freely distributed and if you think it's for you, a unique security code can be obtained from Circle which acts as a key to unlock extra features.

Circle hopes intermediaries will act as software distributors who will be rewarded with sales royalties. First the distributor registers a master copy of the software and the business name and serial number are automatically embedded in the program code. Demo copies of the master program are then freely distributed and any that are unlocked and registered as full working copies will generate royalties for the owner of the master.

For more details contact Circle on (0793) 770 021

NEWS IN BRIEF

● Comdex, the biggest computer exhibition in the America took place in November. America is not a happy hunting ground for Acorn; its one and only venture into the US education market was a major factor in the company's brush with oblivion in the mid-80s.

However, at this year's show, which was held in Las Vegas, Acorn was on hand to demonstrate an A3010, A4 portable and one of the new Pocket Books to a private audience.

Replay demos certainly appeared to impress US journalists who were newcomers to Risc OS. Acorn also revealed that a deal to supply Canadian schools with A3000-series machines was sealed recently.

● Six new correspondence courses specifically for Acorn Risc computer users have been devised by Broad Oak Computers. The courses cost £99 each inc.VAT and they cover C programming, Wimp programming, *Impression 2*, *Pendown*, *Pipedream* and *Schema*.

Broad Oak's first correspondence course on BBC Basic 5 programming has been available for about a year now. Depending on your time allowance, courses can take between a few months and over a year. For further information contact Broad Oak on (0279) 718767.

● Since the advent of Risc OS 3, designing your own 3D sprites for windows, sliders and buttons has become the in-thing. The standard desktop sprites were never great works of art and, as a result they have attracted much criticism: many felt that other window systems looked more attractive.

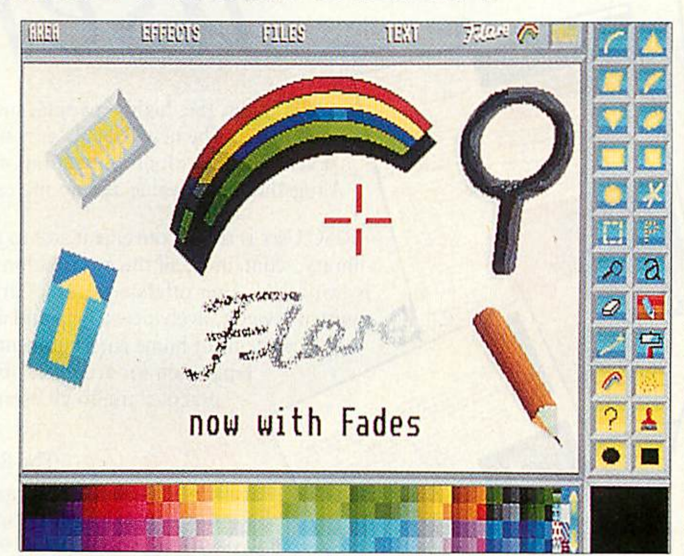
But the diversity of custom designs has been causing headaches for Acorn, which wishes to preserve a consistent look. In response to the proliferation, the head of Risc OS development, William Stoy, has commissioned an 'official' set of Risc OS 3D sprites which should be available early in 1993. There is the distinct possibility that future Rom releases of Risc OS will have the new sprites built in.

ARTISTIC FLARE FROM SILICA

THE FLARE art package has received a new *Fades* carousel, so that users can quickly construct rolling displays.

A selection of 16 fading options is available and users can choose the length of time each image is displayed for as well as add fancy font titles. It's a bit of a surprise to find that this version has only just been endowed with Risc OS printing compatibility.

Silica Software Systems will show the latest version of *Flare* and *Fades* at the BETT show in January. The new package costs £22 inc VAT for education customers; current users can upgrade for a fee of £7. Silica is on (0227) 700279.



Flare can now help you to set up your own slideshows

CHEAPER MULTIMEDIA

THE A5000 multimedia starter kit for schools is now £100 cheaper. It is jointly produced by Acorn and Cumana and the new outfit, based around the Cumana CAA 532 CD-Rom drive, is now £1,699+VAT. This reduction in price was announced despite recent improvements to the A5000 like 4Mb Ram as standard and a hard drive doubled in capacity from 40Mb to 80Mb.

Seven CD-Roms are bundled, including *Revelation 2*, *Space Encyclopaedia*, *The Times and Sunday Times Sampler*, *The Illustrated Shakespeare*, *Illustrated Holy Bible* and *Sherlock Holmes*. Also included is a multi-sync monitor, stereo speakers and a SCSI controller card.

● Another Cumana development is a firmware enhancement, called *EasyShare*, for Cumana SCSI controller cards. *EasyShare* allows small groups of Acorn Risc computers to share SCSI peripherals like CD-Roms and hard disc drives. Up to seven SCSI devices can be attached to one *EasyShare*. Additional *EasyShare* interfaces can be added to extend the network.

Cumana says that while *EasyShare* remains compatible with Econet, SCSI data transfers are considerably faster. Prices start at £170 per computer, with upgrades for existing cards at £50+VAT. Several schools have tried *EasyShare* with positive results. Cumana is on (0483) 503121.


Cumana's latest bundle makes CD-Rom a cheaper option

GUARDIAN READER

VERSION 3 of the pubic domain virus killer, *Guardian*, has been released by Hampshire-based software house Digital Phenomena. The latest version is designed to work with any filing system, including CD-Rom drives.

An auto-scan option deletes any viruses known to *Guardian* as soon as they are detected and a 'wimp watcher' mode prevents any programs from being loaded to your computer by unauthorised users. Those users with Risc Os 2 can also benefit from a built-in file finder and set-type utilities.

Currently, there seems to be something of a disagreement over how many Archimedes viruses actually exist, or indeed what manner of program qualifies as a virus; these come in several different forms. *Guardian 3* only claims to know about five viruses, while Pineapple Software's *VKiller* recognises over 30. According to Digital Phenomena there are several variations of the few core viruses but all are dealt with similarly by the program.

Digital Phenomena will provide free upgrades to users provided they send in a blank disc. Contact Digital Phenomena at 104 Manners Road, Southsea, Hants, PO4 0BG.

NEWS IN BRIEF

● A new Cambridge-based company, Eesox, has been formed with the CD-Rom and multimedia market specifically in mind, including the Acorn platform. Eesox offers CD-Rom mastering for as little as £145, with copies from about £45 in small quantities. Another Eesox product is a CD simulator which enables users to build and test prototype CD-Roms on a hard disc.

The system works exactly like a CD-Rom, even working at the same speed as a CD-Rom drive and operating via CDFS. The CD simulator is priced £129+VAT. Eesox is on (0223) 264242

● *BAU* would like to point out that Ifel Ltd, which produces an Arm3 upgrade with an integral FPA (floating point accelerator) expansion option did not get the idea for such a product from any other third party as may have been implied by last month's Arm Race story. Ifel started research and development on its new Arm3 + FPA as far back as December 1991. The upgrades mentioned in the story are already available: please contact Ifel, Simtec or CJE for more details.

● The winner of a magnum of champagne up for grabs on the Leading Edge stand at the *BAU* Show in October was a Mr Taylor of Worcestershire. If the lucky winner happens to be teetotal, *BAU's* news editor will gladly accept the prize on his behalf.

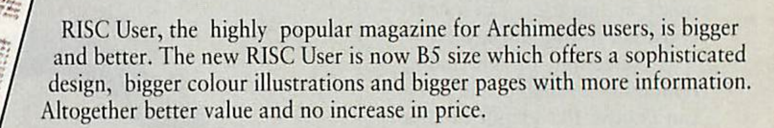
● The Seventh International Computer Show, which some might recall as the 16-bit Computer Fair, takes place between February 19-21, and Acorn will be there. Acorn told us: 'we are pleased to be involved in the show. It represents an ideal opportunity for us to meet the tens of thousands of potential customers face to face. This is particularly important with Acorn's expanding activities in the consumer marketplace.'

The show venue is Hall 1 of the Wembley Exhbition Centre in Northwest London. For more information, call (0726) 68020

● What's new in your world? A new product perhaps, or a snippet of gossip from the Acorn world. Whatever the topic, don't forget to drop us a line.

The New Generation!

RISC user



RISC User, the highly popular magazine for Archimedes users, is bigger and better. The new RISC User is now B5 size which offers a sophisticated design, bigger colour illustrations and bigger pages with more information. Altogether better value and no increase in price.

RISC User is still a convenient size to assemble into an easy-to-use reference library, containing all the information you need as an Archimedes user. Every issue of RISC User offers a wealth of articles and programs with professionally written reviews, lively news, help and advice for beginners and experienced users, and items of home entertainment. Altogether RISC User has established a reputation for accurate, objective and informed articles of real practical use to all users of Acorn's range of RISC computers.

RISC User Disc The RISC User magazine disc is widely acclaimed as the best magazine disc available for Acorn computers. Each disc is packed with original software of the highest quality, fully tested and supported by our own staff plus all the programs from the magazine.

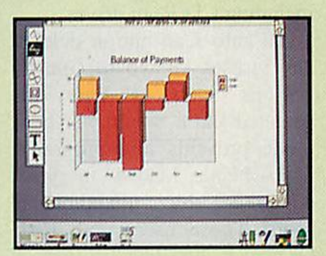
Discounts RISC Developments is also well known for its range of professional software and hardware. As a RISC User subscriber you will receive at least 15% off any RISC Developments' software and 5% off RISC Developments' hardware, and this list of products is constantly growing.

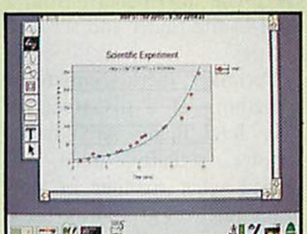
A year's subscription to RISC User is £19.90 for the first year and only £18.40 for a renewal. (Overseas: £29 Europe, £38 Americas and Africa, £41 Elsewhere).



ChartWell Version 1.1

A sophisticated Graph and Chart Package which now offers new features.

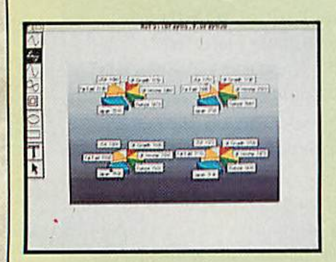




Full handling of ***negative values*** in bar charts (both vertical and horizontal), line graphs and scatter graphs. Where negative values are used, the user will be able to choose whether axis labelling appears on the axis itself or at the left and/or bottom edges of the graph display.

Bar charts using negative values will have the option of a solid or transparent 'zero platform' for 3D displays.

More ***flexible handling of data*** limits, allowing the user to configure ChartWell for handling more data points than the current fixed limit.



Users will now be able to allocate as much of the available memory in their system as they wish for this purpose.

A number of improvements to positioning of labels, titles and values have been incorporated to avoid potential clashes and overlaps which occurred in some

Chartwell and manual Price **£29.95** inc + £2 p&p Code **PCHWb**
Version 1.1 of ChartWell is available free of charge to existing users (send the original disc and a SAE marked **ChartWell Upgrade**).

EVERYTHING YOU WANTED TO KNOW IN ACORN USER AT YOUR FINGERTIPS WITH...

ArcScan III

fast and efficient, fully customisable indexing system for magazines, journals and manuals

Acorn User Index
ArcScan III is a complete multi-tasking indexing system for the Archimedes which now includes rapid access to all references in Acorn User, from January 1987, when the Archimedes was first launched, to date. The index to Acorn User can be easily updated by the user to include later issues. Regular updates are also available from RISC Developments.

ArcScan III is the pre-eminent indexing system for magazines and manuals on the Archimedes. Further indexes will be added to those already available during 1992, and existing indexes will continue to be updated on a regular basis.



ArcScan III includes also the following indexes:

Acorn Computing (January 1987 to date)
Archimedes World (January 1991 to date)
RISC User (November 1987 to date)
BEEBUG (April 1982 to date)
Acorn Manuals forRISC OS 2 and 3
Acorn Programmer's Reference Manual
Acorn ANSI C and Fortran Manuals

Already in use by thousands of Archimedes users.

ArcScan III package consists of:
- ArcScan Program Disc
- Library Disc 1 (containing indexes for Acorn User, Micro User, Archimedes World)
- Comprehensive manual

Price £18.95 Inc + £2.00 p&p (UK) Code **PAS1b**

The complete package contains also:
- Library Disc 2 (containing indexes for RISC User, BEEBUG)

Price £24.95 Inc + £2.00 p&p (UK) Code **PASXb**

RISC Developments Ltd. 117 Hatfield Road, St Albans, Herts AL1 4JS. Tel 0727 40303 Fax 0727 860263

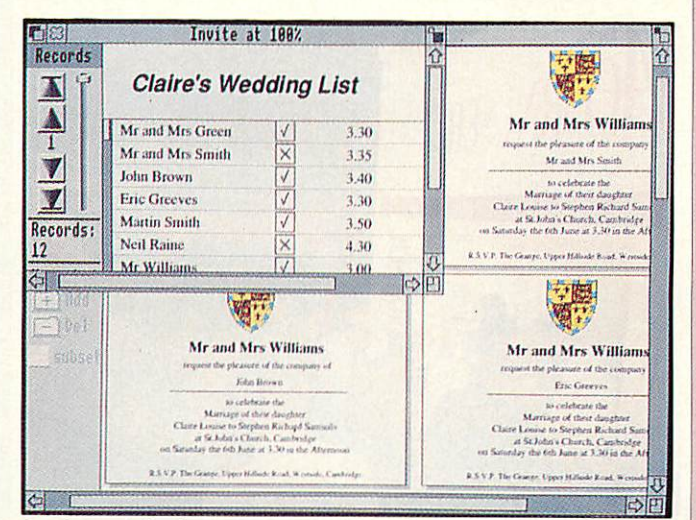
MORE POWER FROM DATAPOWER

DataPower, a new database from Iota software, will be on sale at the BETT show. The database allows DTP-style layouts and Iota claims that it is extremely easy to use.

'From our research, we found that people want a product that combines DTP with a database,' Iota told us.

The product has been under deveopment for two years and includes facilities found on Mac and PC packages, such as *Filemaker* and *Superbase*.

To inspire the new user, Iota includes several examples with the application. One such example – shown right – is a database for wedding invitations. Any addition to the basic list automatically adds another DTP-style invitation.



DataPower helps the new user to make a perfect match

Another example is a dinosaur database for schools that allows pupils to look up details and come up with an illustrated entry.

'The potential uses for this database are enormous,' Iota told us. 'We intend this to be our flagship product.'

Datapower costs £149. More details are available from Iota on (0223) 421542.

NEW GROUND FOR OAK

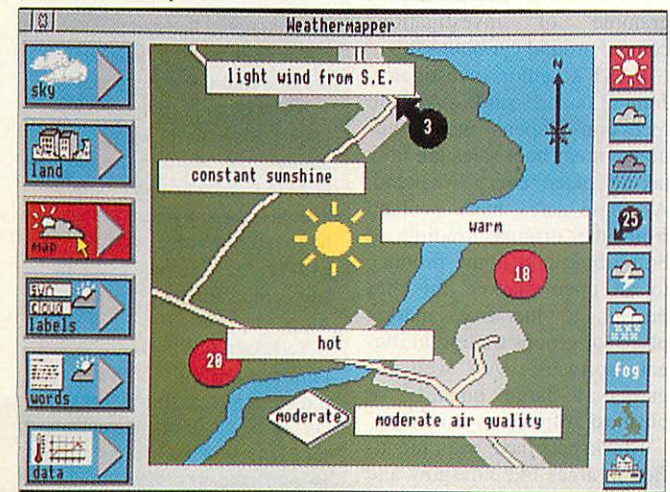
A DIVERSIFICATION into PC software and, possibly, an own-brand PC range will be marked by Oak Solutions' largest ever stand at the BETT Show in January. Microsoft *Windows* versions of *Draw* and *Genesis* will be unveiled at the show; the company is currently considering whether or not to enter the PC market.

According to Oak's Paul Fellows, the should not be interpreted as an abandonment of Acorn machines.

'It's more a case of Oak Solutions growing into new areas,' he said. Fellows said that the development of *Draw* and *Genesis* for *Windows* would indirectly benefit the Acorn versions.

'We're using Microsoft Quick C to develop the Windows applications, and we will eventually replace the existing ABC compiled BBC Basic versions of Genesis, for example, with ported C versions.'

Also on Oak's stand will be *ClassNet* and the latest *Genesis* courseware publications. The 96 square metre stand will have over 20 computers demonstrating various products. For more information contact Oak Solutions on (0274) 620423.



Oak's Genesis: will it now make its mark on the PC?

IT'S BIGGER

OVER 1,300 people attended the Resource conference and exhibition, which took place in Doncaster in November. Numbers were up on last year partly because the event was held over two days for the first time. All the major players in educational IT had stands, including Acorn, and a successful new feature was an IT counselling and advice desk.

Philip Lewis of the Department of Education's IT Unit opened the show and gave the keynote speech. He talked about 'policy, practice and professionalism', issues that he said have to be addressed in the IT field.

The parallel seminars, organised by NCET, addressed a range of topics, from assessment to tackling dyslexia. Of particular interest was Mike Detheridge's session on the CD-Roms currently in development under the Government scheme and he assured the audience that Acorn titles will run under Risc Os, not under the cumbersome PC Emulator.

Plans for next year's Resource are already under way but it's anticipated that it will take place on a Friday and Saturday, to alleviate the problems of obtaining cover.

NEWS IN BRIEF

● Rumours of a major new games console based on Arm processor technology are still rife in the industry.

Sketchy details about a Panasonic-backed company called CDO with a 32-bit processor based machine were published by a computer trade paper, and the *BAU* grapevine suggests that major UK games software houses have been actively scouting for Arm coders.

Arm Ltd had no comment to make about the story, though managing director, Robin Saxby, said that he hoped a Japanese deal would be announced by the end of the year. Another *Acorn User* source has indicated that more than one deal can be expected.

● A slimline floppy disc wallet has been produced by Rubycliff Limited. Called the Disc Diary, the wallet holds six 3.5in discs. Disc Diaries are also available with the user's corporate logo printed on them. You can contact Rubycliff on (0420) 478 377.

● Amateur disc-based magazines seem to be all the rage. The latest we know of is from AAUC (Acorn Archimedes User Club). The AAUC describes itself as a cross between a disc-based magazine and club. Subscribers get two discs every month containing PD software, classified ads, articles and corrspondence.

Information about the AAUC is available on disc and, to get this, either send £1 or a blank disc with an self-addressed envelope to The AAUC, 58a Bransome Drive, Nabwood, Shipley, West Yorks, BD18 4BE.

● An exclusive help service is at hand to all Members of The Arm Club – formerly Club A3000 – and subscribers to the ASTE *Syracuse* disc magazine.

On offer is day to day Archimedes problem solving, software consultancy plus demonstrations and guides to popular programs with demos provided where available.

The Archimedes Help Service will be run by PD author, Toby Smith, and he can be contacted on (0533) 413 850 from 6-9pm, or at weekends, or by post from 7 St Catharine's Way, Houghton-on-the-Hill, LE7 9HE.

ACORN USER THROWS TWO SHOWS

TWO separate consumer exhibitions – Acorn World at Wembley and the *BBC Acorn User* Spring Show in Harrogate – are being planned for next year and will be exclusively sponsored by *BBC Acorn User* magazine.

Following the successful track record of the autumn *BBC Acorn User* show, Acorn Computers has pledged to organise and support next year's event, and plans to make it 'bigger than ever'.

Acorn World 1993 will take place in the larger Hall One of the Wembley Exhibition Centre from October 29 to 31. It is anticipated that the show will attract a higher number of both exhibitors and visitors and, through its individual business units, Acorn is planning to create special feature areas covering education; home and leisure; games; publishing, and more. A range of helpful clinics and presentations are also in preparation.

In addition to this major Autumn show, we are also responding to readers' requests for an event in the north of England with the *BBC Acorn User* Spring Show 1993 in Harrogate. Organised by Safesell Exhibitions, the show will be held at the Harrogate International Conference and Exhibition Centre from April 15 to 17 1993 and will feature most key Acorn companies.

New products, demonstrations and features will be part of the Spring Show package and, of course, the team from *BBC Acorn User* will be on hand to give helpful advice.

Further details of the Acorn World exhibition at Wembley will appear in *BAU* in the near future. Interested exhibitors should contact Michael White Associates on (0763) 261938.

Further details of the *BAU* Spring Show in Harrogate can be obtained from Safesell on (0737) 814713.



Acorn User is now covering the whole country with two shows

CUB COMES OF AGE

AN INTEGRAL part of the Beeb's image since the first BBC Micro appeared ten years ago, the familiar boxy Microvitec Cub monitor lives on. This time it is found in a specially matched guise for the new Acorn's new A3000 and A4000 ranges.


Still popular: the familar Cub

The Cub, which was Acorn's badged monitor for the old BBC micro for many years, has sold no fewer than 350,000 units in its long life.

The new Cub 3000 has a special jack socket for compatibility with the latest Acorns and users of existing Cub monitors withou the the new jack can contact Microvitec for an upgrade. Microvitec is on (0274) 390011.

ON YOUR SCREENS NOW

A NEW series of TV and press adverts shows Acorn squarely targetting the home market. The TV ad depicts the differing computing needs of a father and son: the son wants games; the father is looking for educational value as well.

The TV ad was produced by Primary Contact, using a split screen technique and the national campaign started on November 10th to run up to Christmas.

Look out for TV-am, Sky, Channel 4 and selected ITV regions. National press ads to back up the TV campaign have appeared in the Sunday newspapers.

BOOT UP

CAR BOOT sales have recently become a lucrative area for software pirates. And, as a result, Federation Against Software Theft (FAST) has issued a warning to deter the thieves.

FAST is to coordinate an operation in conjunction with the UK's 1600 Trading Standards officers to establish a nationwide database and programme of investigations centred around car boot sales.

FAST's senior investigator, John Loader, said: 'As the recession deepens, many hundreds of car boot sales are now taking place every weekend. As these sales have evolved from the original trading of bric-a-brac and home produce to an open market, this has proved a lucrative market place for groups trading in illegal software. As well as games, a large quantity of business software is available.'

Blackspots have been identified in areas like Glasgow and West Yorkshire.

NEWS IN BRIEF

● *Picture It!* and *Find It!* have been released as new versions. The former is a flexible picture-building program which can be viewed as a user-friendly drawing program. The main program is priced at £29.95 and can work with a selection of topic libraries at £8.50 each. An animation program Appian way describes as the simplest available on the Archimedes is also supplied.

Compatible with Acorn *Draw*, this latest version of *Picture It!* has improved graphic manipulation tools.

Find It! is an easy to use introductory database program for primary school level. The program has been made more attractive on the screen, has better graphing facilities and easier printing options. *Find It!* is priced at £29.95 and sample databases costing £6.50 will be available shortly. Appian Way is on 091-373 1389

● Three foreign language sets have been released by L'Ensouleiado Software. *Ciao!* is the Italian version of L'Ensouleiado's absolute beginners or special needs category range of foreign language programs. Priced at £55+VAT, other languages in the set include French, German, Spanish, Italian and English.

Allons! is a three disc suite of programs for first-year French students, priced £18 per disc or £48 for the set. Finally, *German Verbs* is available also for £18 per disc.

Other languages are steadily being added across the range. For further information, contact Julia Higham on (0673) 42224.

● The Hewlett Packard LaserJet 4 has arrived, and it offers 600dpi printing resolution as standard.

Based on the Canon LBP-BX engine, the LaserJet 4 would appear to bring affordable high resolution laser printing to the market – the entry-level model has a recommended price of £1649+VAT, which will probably translate to around £1200 in the shops.

Technology to optimise PC Windows printing is built in to the printers. A PostScript Level 2 version of the printer is available for £2249. Hewlett Packard can be contacted on (0344) 369222.



MAGPIE

SPREADS ITS WINGS

If a picture is worth a thousand words, how many more words is a movie with sound worth?

Magpie **is an easy-to-use 'Multimedia' program for Acorn Archimedes.** ***Magpie*** **lets you put words, pictures and sounds together on the same page. The pictures can be drawings, photographs, and now moving video too.**

Use *Magpie* for:

- Simple page design and DTP
- Reports and projects
- Delivering graphics resources to users
- Branching stories
- Presentations and rolling demonstrations
- Complex information systems
- CD ROM publishing.



CD Audio

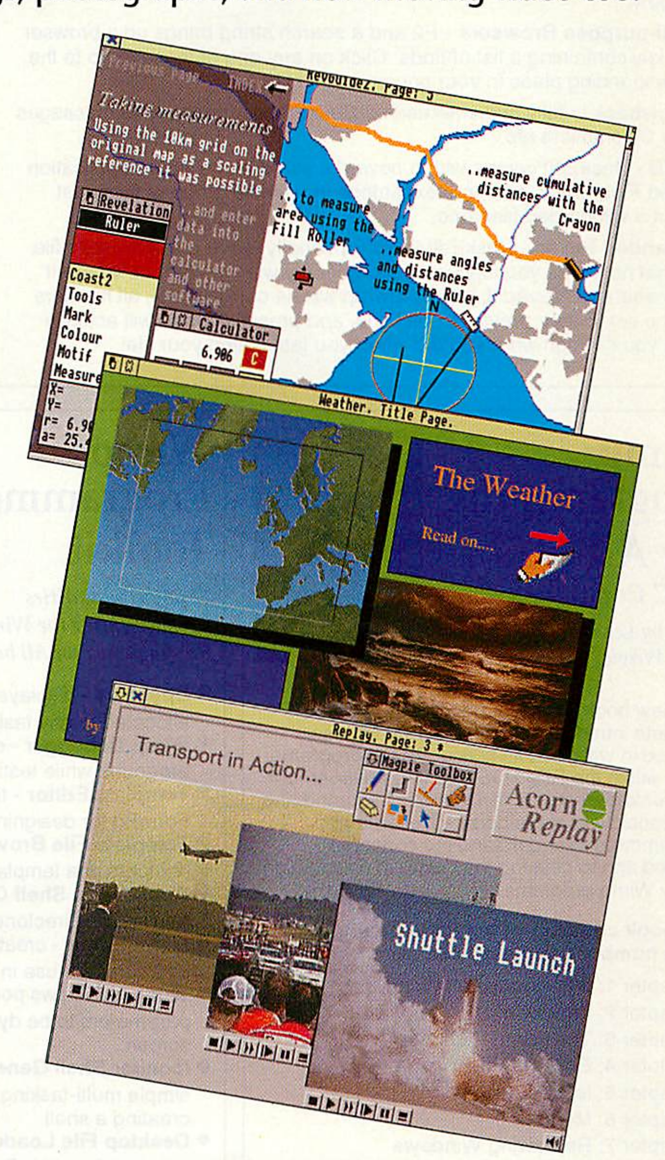
But that's not all! *Magpie* supports CD Audio too. Now you can play any section or track of an ordinary audio compact disc at the press of a button. Combined with the ability to automatically turn pages, you can bring sounds and images together in ever more imaginative ways.



Acorn Replay

Acorn Replay is a brand new facility which allows moving video (most commonly from a CD ROM) to be played through an Archimedes computer.

You can now place a Replay movie on a *Magpie* page. Children will find the simple 'cassette recorder' type control icons easy to use. Imagine a project about space. Now you can make *Magpie* pages with text, drawings, scanned images, sound effects — *and* a colour film of the space shuttle taking off, complete with sound!



MAGPIE — Information By Design

Single user £59
Primary Site Licence £190
Secondary Site Licence £330

Magpie's new features are available free of charge to registered users upon request.



124 Science Park
Milton Road
Cambridge CB4 4ZS
Tel (0223) 425558
Fax (0223) 425349

Essential Products for Programmers

THE BEST PROGRAM AND TEXT EDITOR FOR THE ARC

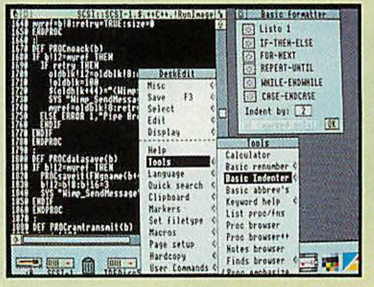
DeskEdit 2

HAS JUST GOT A LOT BETTER

A major new release of the popular and powerful editor DeskEdit brings a whole toolkit of features that will assist all programmers, whether novice or experienced, and whether using Basic or C - and all within Acorn's powerful multi-tasking RISC OS Desktop. There is a lot for text users too.

New features include:

- **Basic program Renumber** - including partial renumber and marked sections.
- **Basic Program Indenter** - automatically reformats Basic programs to indent after IF THEN, REPEAT, FOR etc. - all fully customisable.
- **Basic Abbreviations** - all Basic V's several hundred abbreviations are implemented (optionally).
- **Programmer's Calculator** - a powerful calculator especially designed for handling bits and bytes. Simultaneously operates in decimal, hex and binary, and can import and export results to and from any text window.
- **Multi-purpose Browsers** - F2 and a search string brings up a browser window containing a list of finds. Click on any one of these to go to the corresponding place in your source or text file.
- **Throwback** is fully implemented so DeskEdit can respond to messages from C compilers etc.
- **!FIND** - DeskEdit comes with a powerful stand-alone Acorn application called *Find*, which can find text strings in a whole group of files, just given a wildcarded filename.
- **Extended Saves** - DeskEdit 2 will (optionally) save a special data file so that next time you load your file, not only will the caret be where it was when you saved it, but wordwrap will be correctly set, all markers will be set to their previous positions, and pressing Undo will actually take you through what you did when you last edited your file!



And there is much more that is new in DeskEdit 2:

A new Keyword **Help** can now give help on any keyword marked in your text. A full Basic Help file is included.

QuickSearch can now be performed backwards as well as forwards, and can also find procedure and function definitions. You can even use a marked piece of text to supply the target string for a Quicksearch.

And a lot more - all designed to make editing fast and efficient.

All this of course is in addition to the features that have made DeskEdit so popular among users of Acorn machines, and which resulted in GLOWING REVIEWS when it was first launched a year ago.

...offers much to the user... a good deal of thought has evidently gone into its development.... a worthwhile upgrade from Edit... **Acorn User**

...replete with well thought out and flexible features... very attractive... remarkably inexpensive for what it offers... should prove very popular. **Archimedes World**

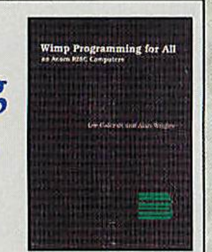
...a wonderful piece of software... deserves to be on everyone's icon bar... Acorn would do well to provide it free with every machine it sells... so much (is provided) that you wonder how you managed before. **Archive**

IN FACT DESKEDIT IS SO GOOD THAT IT IS USED WITHIN ACORN ITSELF!

DeskEdit 2 (disc, new manual, keystri and quick reference card) PDE2b **£31.95** inc + £2 p&p
DeskEdit 2 Upgrade (please return original disc) Code PDEXa £9.95 inc + £2 p&p

Wimp Programming for All on Acorn RISC Computers

book by Lee Calcraft and Alan Wrigley



This new book provides programmers with a complete introduction to all the techniques involved in writing multi-tasking Wimp programs to run within the RISC OS Desktop environment. No prior knowledge of the Wimp is assumed and the tutorial style of the book will enable all programmers to understand the concepts involved and to develop their skills in writing high quality Wimp programs.

The book consists of ten main chapters and a number of appendices:

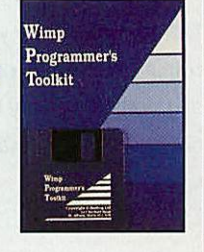
- Chapter 1: Introducing the Wimp
- Chapter 2: Windows
- Chapter 3: The Wimp Poll Loop
- Chapter 4: Error Handling
- Chapter 5: Icons
- Chapter 6: Menus
- Chapter 7: Redrawing Windows
- Chapter 8: The Wimp Message System, Loading and Saving Data
- Chapter 9: Templates
- Chapter 10: Printer Drivers and Outline Fonts

To support the book there is a **disc** containing all the programs as listed within the book, together with additional supporting applications.

Wimp Programming for All book £12.95 + £2 p&p Code BK12 **Disc** £4.95 + £1 p&p Code BK13

Wimp Programmer's Toolkit

12 powerful utilities complementing the Wimp Programming for All book



- **Spyglass -** displays the contents of memory allocated to any task currently running.
- **Wimp Debugger** - debug Wimp-based programs while testing and running them.
- **Template Editor -** the latest version of Acorn's FormEd for designing windows and icons.
- **Template File Browser** allows you to view the contents of a template file.
- **Application Shell Generator** - for creating application directories, Obey files and sprites.
- **Menu Editor** - create and edit Wimp menu structures for use in your own programs.
- **WimpAid** allows pointer, window and icon parameters to be dynamically displayed on screen.
- **Iconbar Shell Generator** allows you to build simple multi-tasking programs very easily, by creating a shell.
- **Desktop File Loader** allows you to load a program from the Desktop, rather than run it.
- **Icon Flag Generator** calculates the value of icon flags without recourse to binary arithmetic.
- **EasyWimp** provides a ready-made Wimp application shell to be used for creation of single-window applications.
- **Wimp Message Monitor** provides a means of monitoring the Wimp polling system.

Wimp Programmer's Toolkit and manual **£19.95** + £2 p&p Code **PWPTb**

File Handling for All

book y David Spencer and Mike Williams



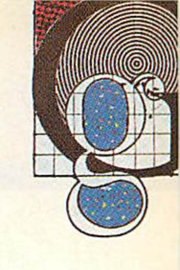
File Handling for All is a comprehensive book which covers all the requirements of data storage and processing by computer, using the popular BBC Basic programming language for the examples. It is aimed at anybody interested in File Handling and Databases, whether beginners or more advanced users, and will appeal to all who want to learn more of this important subject.

The book starts with an introduction to the rudiments of file handling, and in the following chapters develops an in-depth look at the different types of files e.g. serial files, indexed files, direct access files, and searching and sorting. A separate chapter is devoted to hierarchical and relational database design, and the book concludes with practical advice on developing file handling programs.

The associated disc (£4.75) contains complete working programs based on the routines described in the book and a copy of Filer, a full-feature Database program.

File Handling for All book **£9.95** + £2 p&p
Stock Code **BKO2b**
Disc supporting the book **£4.75** + £2 p&p
Stock Code **BKO3a**

RISC Developments Ltd. 117 Hatfield Road, St Albans, Herts AL1 4JS. Tel. 0727 40303 Fax 0727 860263



UP CARDS

WITH the arrival of the new VIDC20 chip, the move towards full 24-bit colour displays has increased with two new graphic enhancer/accelerator boards. State Machine's G8 range of cards and Computer Concepts' Colour Card.

The two cards are similar in a number of ways. Both allow higher resolution modes to be generated by the computer while maintaining a palette of 256 colours and in both cases, allow the palette to be altered to display any 256 colours from a selection of 16,777,216. True grey scales can be displayed on screen to allow accurate preview of scanned images and other 'black and white' artwork.

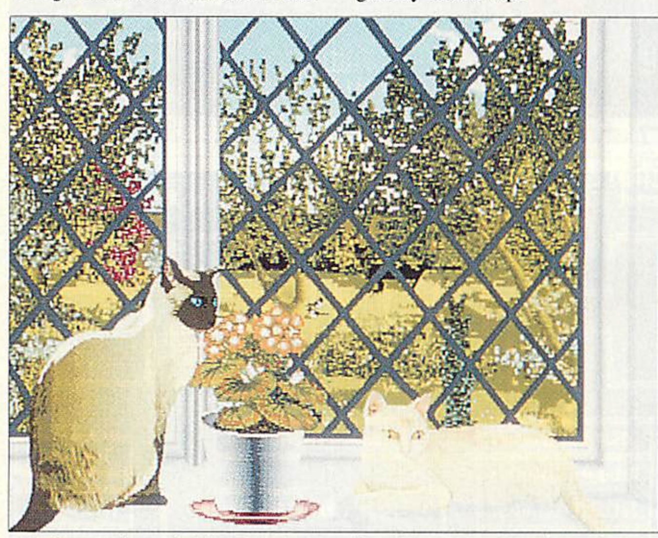
CC's Colour Card has a special non-desktop mode that allows pictures to be rendered in up to 32,768 colours, and a special program lets you preview *ArtWorks* files using the extended palette. This also means that files from programs such as Clares' *Illusionist* can now be seen in true colour.

For more details of both colour cards, see our review on page 61.

PICTURE OF THE MONTH

PICTURES have been flooding into the graphics page office over the past few months. Perhaps all those long, dark evenings? The 'pick of the crop' prize this month goes to Mrs Pamela Woodhead for her picture *Windows*. *Windows* was created in two parts using *Atelier*. The background (garden) was drawn as a separate picture and then the foreground was drawn over the top. If you've sent in a picture and have not seen anything published, don't worry. There are lots of entries and only a small amount of space in which to show them.

A tip for aspiring winners is that if the idea is original or the picture has been created using some innovative method, it has more chance of making it. And keep a look out for our gallery round-up.



'Windows', drawn by Mrs Pamela Woodhead in Nottinghamshire. She used Artelier to create a two-layered picture

IN BRIEF

● From Longman Logotron comes a repackaged version of its original *Revelation* art package. Nothing's new (check out *Revelation 2* and *Revelation Image Pro* if you want a more advanced version) except the price, which has been reduced to £46.95 (inc. VAT). Primary Schools are being targeted as the main area where *Revelation* could be of use, although I would recommend it as an ideal starting point for anyone interested in painting on the Archimedes. More details can be gleaned from Longman Logotron, 124 Cambridge Science Park, Milton Road, Cambridge CB4 4ZS. Tel. (0223) 425558.

● New name Smart DTP has arrived on the Acorn scene to provide a range of clip-art, borders and other resources like corners, symbols, flashes, arrows and speech bubbles. The company also offers a laser printing and scanning service. A Christmas offer which expires on the big day itself is for a catalogue and disc including Christmas clip art examples for just £1. Contact Smart DTP at 36 Park Road, Duffield, Belper, DE56 4GR.

●Comedian Stephen Fry was distracted during a recent *Jeeves and Wooster* shoot. The shoot was at the home of Computer Concepts (Gaddesden Place) and the distraction was none other than the *Artworks* package.

Fry is a long-time Beeb user and has written scripts using *Wordwise*. Now it it seems than an Acorn machine has joined the Fry household after Fry took time off from *Jeeves and Wooster* to get a demonstration of *ArtWorks* from CC's Jim Lynn.

Stephen Fry was even moved to write a letter of thanks saying: 'If anything were to persuade me that an Archimedes is worth buying it would be the scrummy *ArtWorks* and all its loveliness.' Apparently Fry is a keen user of *Aldus Freehand* on the Mac but was surprised at the superiority of certain aspects of *ArtWorks*.

If you want to see Computer Concepts' stately offices on the box, keep an eye out for the next series of *Jeeves and Wooster* screened this s2.pring.

Ian Burley

ANIMATE OBJECTS

NEW from Devon-based software house 4Mation is *Noot*, an education-based program that allows animations to be built up from a collection of *Draw* files. Animated sequences can be incorporated into special pages of information, a bit like existing 'hypertext' systems, and these pages can then be linked to pieces of text.

There are six animated files included with the *Noot* package, including *Playroom*, *Farm* and *How It Works*. *Playroom* shows a number of toys, each of which can be animated by typing in the appropriate word, and *Farm* contains a number of scenes in which various animated animals appear.

How It Works is an animated sequence aimed at a slightly older age group and includes a number of animations demonstrating how various common and not so common objects work, such as the human heart, a door lock and a sewing machine.

Noot comes complete with *NootPad*, which is an application for generating your own *Noot* sequençes. *Draw* files can be imported from other programs such as *Vector*, *ArtWorks*, and of course *Draw* itself. A musical accompaniment can be provided for animations by including *Soundtracker* files into *NootPad*.

Noot costs £52.85 (inc VAT). Further information about the program and its associated animation files can be obtained from 4Mation, 14 Castle Park Road, Barnstaple, Devon, EX32 8PA. Tel. (0271) 25353.

Rob Miller

3D DESIGN

EXPLAN, producer of the Arcol Desktop paint package, is releasing the successor to its 3D modelling program, *Tabs*. *Architech* is a desktop compatible 3D design program.

Any solid object can be designed on screen, and then converted into a flat 'plan' which can then be cut out and stuck together, in the form of cardboard or paper models. Sprites can be mapped onto any of the object's facets, giving models a more realistic appearance. Finished models can be previewed on screen to ensure you get the required result when printed. A release date for *Architech* has not yet been fixed, although the first part of 1993 is seen as the likely time.

Further information can be obtained from ExpLAN UK Ltd on (0822) 613868.



COMMS ENTERS EUROPEAN AGE

1993 sees the relaxation of EEC border controls, so now is a good time to take a look at the European Acorn BBS scene. For UK-based BBS users, the call costs to most European boards will deter them from spending much time looking around.

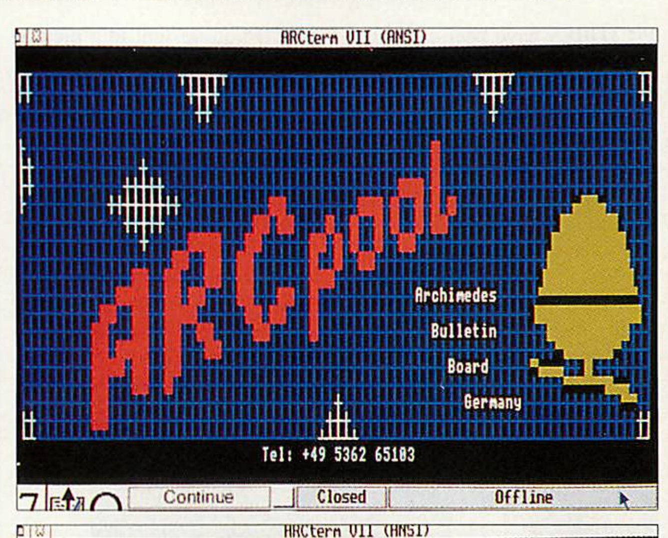
Conversely, many UK bulletin boards already receive regular calls from European users wanting to get the latest news, tips and information about Acorn machines. For European users who don't want to call the UK, FidoNet Archimedes message echoes are spread all around Europe, to Holland, Denmark, Germany, Sweden and other countries.

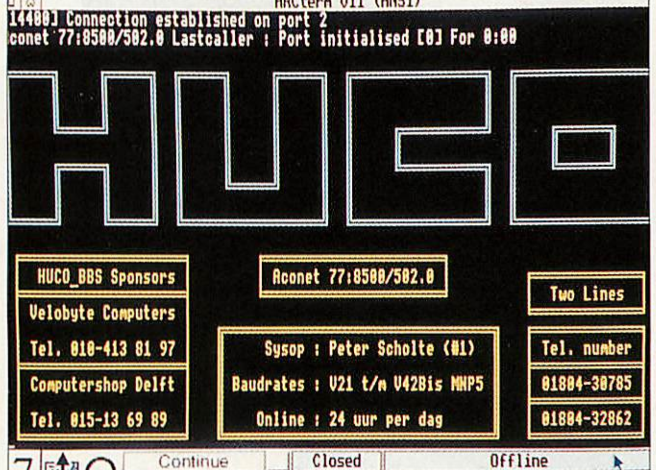
Although many European BBS systems operate in their native languages, there are often English translations in the menus, and it's fairly easy to guess the main functions.

For instance, bulletin boards running *ArcBBS* software have a family likeness that can greatly help understanding – but perhaps here is an incentive to brush up on a foreign language. After all, callers to the UK from Europe have to wrestle with a very difficult second language; English. For some typical boards try:

- **Germany** ARCpool +49 5362 65103
- **Sweden** ArcBase +46 8 965195
- **Holland** HUCO BBS +31 1804 32862 & 30785
- **Denmark** QUERCUS +45 316 79770.

Among the usual material that you expect to find on any BBS, there is always the possibility of finding a gem of a program that hasn't yet found its way to the UK. The author may like to internationalise his reputation, and be delighted to hear from UK users.





Eurocomms on line: Germany's Arcpool (top) and Holland's HUCO (bottom)

ARC CO-OP

AUTHORS of some of the popular Archimedes comms software packages have got together to enable their products to share the machine's serial port.

Each program can claim the port from another if it's idle, and give it up if requested when not using it. The latest versions of *Hearsay 2*, *ArcFax* and *Arcterm7* can all be loaded together, and whichever program is active will claim the port from the others, avoiding interaction; an example of cooperation both between authors and tasks.

SOLUTION FOR RISC OS 3

MANY bulletin board users using high-speed modems have been reporting download problems since upgrading to Risc OS 3.1. Typically they have been getting repeated data corruption or failed downloads.

The problems can be minimised by a few simple steps, such as downloading to Ram disc, using a low resolution screen mode like Mode 12, by reducing the number of applications running while downloading, and by not moving the mouse about. All these things help to reduce the number of interrupts that the Arm processor has to deal with one at a time.

The problem with Risc OS 3.1 is that because it has many more whizzy features, it takes a bit longer to respond to an interrupt that RO2 did. In fact 9600 baud is its specified maximum data rate. When data arrives at higher speeds than this at the serial chip, it can happen that the character waiting to be read is being overwritten by another one arriving in the holding register before RISC OS 3.1 has processed the interrupt to read it.

NEWS IN BRIEF

- You probably won't find Multitech's Multimodem Micro in your Xmas stocking, but it could be the ultimate future-proof portable.

Supporting all speeds from V21 to V32bis (including V23 split speed) with MNP5 and V42bis error correction, Group 3 Class 2 Fax operation, 12 LED indicators, flash programmable firmware, captive serial lead, free comms and Fax software, battery or (supplied) mains power adaptor and canvas carrying case,

The price for all this? Only £749 ex VAT. Contact Multitech at Gibbs House, Kennel Ride, Ascot, Berkshire SL5 7NT Tel: (0344) 891266.

- Miracom Technology has released its promised re-engineered Dual Standard modem which now sports new 16K8 baud HST and Group 3 Fax standards. The new DS-16K8/Fax modem is half the size of its predecessor, and offers all speeds from 300 to 16K8 HST, with MNP5 or V42b compression, and also Group 3 Fax.

It will be upgradable to the V FAST standard when it is announced. At present they are only available to Sysops on the special Miracom UK Sysop deal at £450 including delivery and VAT. For the modem that does everything, contact Hawkastle Ltd., in Staines, Middlesex on (0784) 449991.

- Silicon Village's offer of free access (meaning no time charges) between 6am on Sundays to 6am Mondays runs until the end of December. There is also currently a British Telecom offer of local call charges on most long-distance calls between 3pm and midnight on Sundays until the end of the year. Silicon Village is a ViewData system on 081-759 2348 (1200/75), 081-759 6996 and Reading (0734) 819000.

- You can contact me with any news or information you'd like to be included by writing to:

David Dade, BBC Acorn User, 101 Bayham Street, London NW1 0AG or by MODEM on Arcade BBS, User #2 – 081 654 2212 or 081 655 4412

For the BBC A3000 / Acorn Archimedes

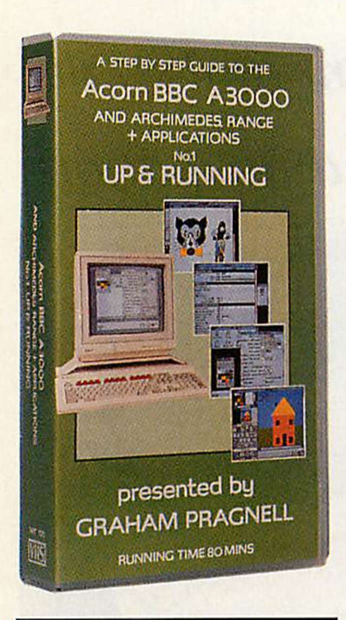
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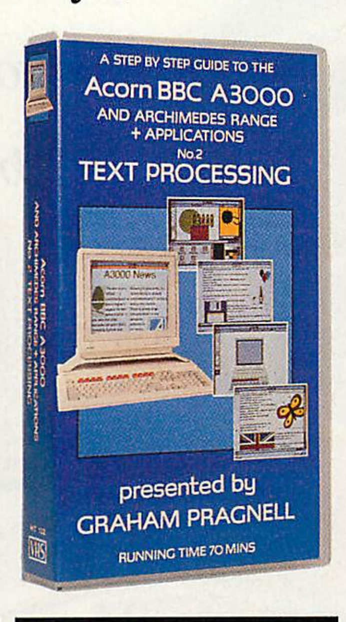
Normal price £14.99 available exclusively to readers of

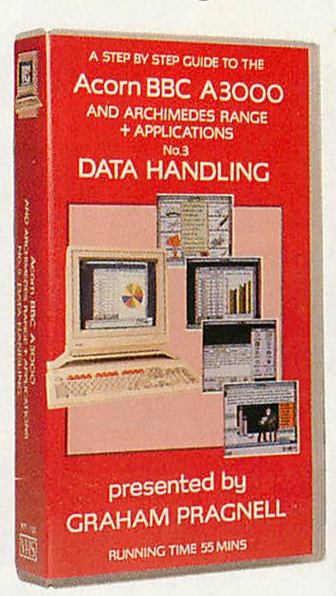
BBC ACORN USER

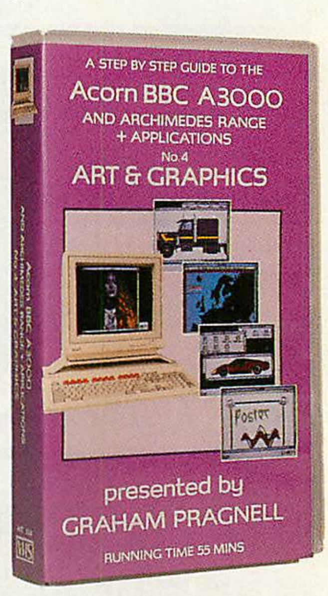
Save £5 per video

at only £9.99 each including delivery









1. Up & Running

An introduction to your easy to use, powerful multitasking BBC A3000 / Acorn Archimedes.

This video features:

- How to load and run software
- How to save to disc
- How to print
- How to edit text through *Edit*
- How to handle graphics through *Paint* and *Draw*

2. Text Processing

Word processing offers easy text manipulation for highly polished results, while Desktop Publishing offers a variety of page formats and the use of diagrams and pictures

This video features:

- *First Word Plus*
- *Phase#2*
- *Ovation Professional DTP*
- *Technoscan ll*

3. Data Handling

Your BBC A3000 / Acorn Archimedes offers powerful data processing coupled with professional graphic display

This video features:

- *Data Sweet*
- *Squirrel*
- *Schema*
- *Genesis*
- *Magpie*

4. Art & Graphics

Speed and ease of use makes the multitasking BBC A3000 / Acorn Archimedes computer superb for art and graphics. Effects can be created and undone at the touch of a button. Make full use of the 256 - colour palette that the machines put at your fingertips.

This video features:

- *Paint*
- *Revelation*
- *Poster*
- *Technoscan ll*

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3. DATA HANDLING	£9.99		
4. ART & GRAPHICS	£9.99		
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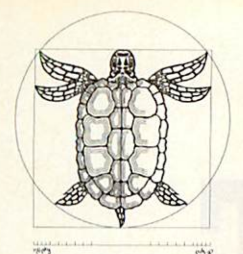
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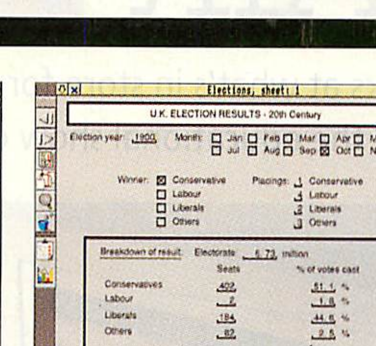
Please allow 10 days for delivery

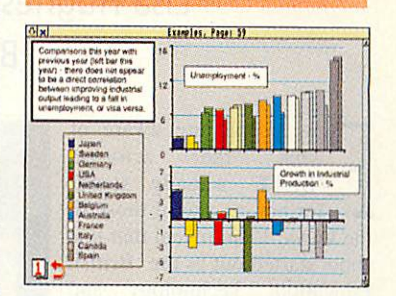


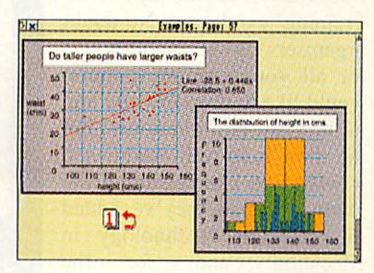
LONGMAN LOGOTRON

PinPoint

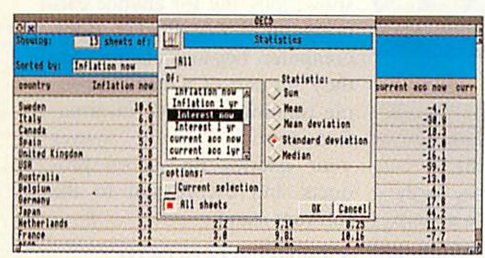
> “The ease with which data collection may be organised and implemented is a joy.”
>
> **Frank Jukes, Micro User, January 1992**

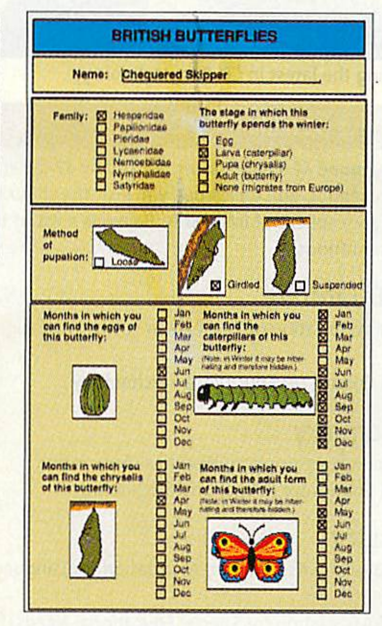


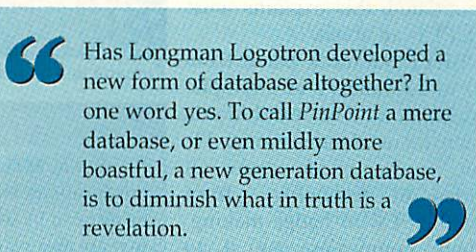




> “*PinPoint* is certainly a new generation database, making the handling of data as easy as it should be. Its concept and execution is brilliant — data handling is about collecting data efficiently, and that is what *PinPoint* does. *PinPoint* is powerful yet simple to use and will take educational data-handling into a new era.”
>
> **Dave Futcher, BBC Acorn User December 1991**

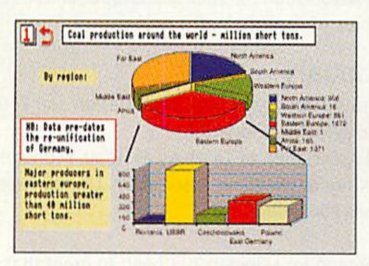






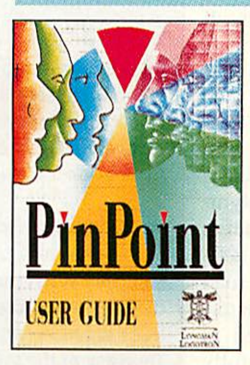
> “Has Longman Logotron developed a new form of database altogether? In one word yes. To call *PinPoint* a mere database, or even mildly more boastful, a new generation database, is to diminish what in truth is a revelation.”
>
> “The scope and variety of *PinPoint* is quite astonishing. The sheer variety, the power, the complexity of this program is astounding. The analysis and display aspects are both powerful and attractive enough to operate in both an educational and business environment. Databases will never be the same after this.”
>
> **Duncan Evans, Archimedes World December 1991**

> “*Pinpoint* takes databases into a new dimension in several ways. First, form design. *PinPoint* is about as adaptable as the best desktop publishing package when it comes to creating the form upon which information will later be entered and stored.”
>
> “When its abilities to produce statistics, charts and diagrams (with more ease and speed than I would have believed possible), and to print the results in attractively designed page format is considered too, then it becomes an essential purchase for anybody wishing to collect, analyse and present information.”
>
> **Chris Davies, Times Educational Supplement, November 1991**

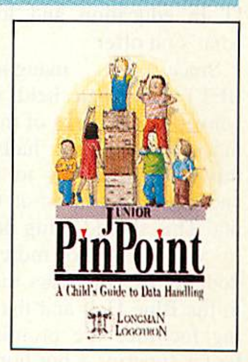


Longman Logotron
124 Science Park
Milton Road
Cambridge CB4 4ZS.

Tel. (0223) 425558
Fax (0223) 425349



PinPoint for the Acorn Archimedes is priced at £99. A Site Licence costs £400.



A special version for primary schools is priced at £24. A Site Licence costs £72.

A FAIR BETT

Lisa Hughes looks at what's in store for Acorn enthusiasts at BETT: the educational show of the year

Few people are aware of what the acronym 'BETT' actually stands for but, as one of those in the know, I can reveal that this show started out as the 'British Education, Technology and Training' exhibition. No doubt organisers EMAP (another one for all you acronym-spotters) would like to drop the title and its William Hill overtones, but the show is so well-established it would be like renaming the Derby. Instead they've added the catchline 'technology in education' and, for the uninitiated, this explains what BETT is all about.

BETT 93 takes place from 20 to 23 January at Olympia, in London. The exhibition's main focus is educational IT, but it also encompasses all forms of technology, from satellite TV to badge-making. Many companies use it to launch new products but there is trailing-, as well as leading-edge, technology on view; if you hunt around the 250-odd stands you'll find Beeb programs as well as CD-Roms.

There are specific areas for publishing and special needs and an extensive seminar programme runs alongside the show. Although most visitors are professional educationalists, the event will also be of interest to parents and governors who want to learn about IT in education and look at what's on offer.

Since its inauguration, BETT has been held in the converted car parks of the Barbican's exhibition halls, but this year it moves to bigger and better premises at Olympia. This should bring benefits to visitors – no more taxi-dodging as you cross the road to the Blue Hall and the catering facilities are promised to be far superior – but hopefully the show won't lose its friendly, even intimate, atmosphere.



Cumana will be featuring the latest in CD-Rom technology

BETT 93 SEMINAR PROGRAMME

On offer at BETT are around 40 seminars, introduced by 17 different organisations, in two venues, and which day you visit the show may partly be dictated by what your sphere of interest is. Below is a list of the groups that are making presentations.

Wednesday 20 January
Apex Room: National Association of Teachers in Further and Higher Education
Club Room: National Council for Educational Technology

Thursday 21 January
Apex Room: Geographical Association, Historical Association
Club Room: National Council for Educational Technology

Friday 22 January
Apex Room: British Dyslexia Association, Association for Language Learning
Club Room: National Association for Special Educational Needs, National Association for Teachers of English, Maths Association

Saturday 23 January
Apex Room: Incorporated Society of Musicians, Design and Technology Association, Secondary Heads Association
Club Room: National Association of Teachers of Home Economics and Technology, United Kingdom Reading Association, Library Association, Association for Science Education

In previous years, demand for seminars has been so great that people have been turned away. This year, 60 percent of the seats at each session are bookable in advance, at a cost of £10. The remaining seats are available on the day, free of charge, but on a first come, first served basis. However, the NCET seminars, which take place in the Club Room on the Wednesday and Thursday of the show, are free but cannot be booked. For full details of the seminar programme, and to reserve tickets, call 071-831 1526.

Acorn specialists are grouped together in the Acorn Village, situated opposite the entrance, at the back of the main hall, and this is where you'll find *BBC Acorn User* as well. Acorn itself is adjacent to the village. However, make sure you visit the rest of the show, too, because many other exhibitors will be demonstrating Acorn software, hardware and support services – you can tell which ones they are by a sign shaped like an acorn attached to the stand name.

If you get lost around the show, look out for anyone carrying an Acorn Pocket Book computer, because chances are they are part of a team of people running a special information service. They'll answer your queries on Acorn products and escort you to the relevant stand.

ACORN ON SHOW

Acorn won't be making any major product announcements at BETT but there will be a couple of new launches which promise to be significant for education and on its large stand you'll be able to check out the full hardware range, from the Pocket Book to the A5000. If you're interested in CD-Rom, Acorn's system, plus a selection of discs, will also be on view. Solutions for special needs users can be seen on the Acorn stand in the Special Needs Village.

In terms of IT support, representatives from many of the Acorn in Education centres will also be on hand and a number of them also have their own stands at the show.

Acorn confidently states that 'Schools using Acorn systems are guaranteed a continuity, a quality of equipment and software and a level of support for the use of IT that is the envy of others.' The invitation to BETT visitors is to 'come and see why'.

PERIPHERALS

In terms of other hardware and peripheral-related products, Risc Developments will be showing items aimed particularly at education, including IDE hard drives, memory upgrade boards and the Spectra colour scanner. Software such as the new multitasking *Masterfile III*, *Desk-Edit 2*, *PolyGlot* and *Chartwell* will also be on view. Callers to the stand can pick up a free education pack containing a demo copy of *Ovation* and a sample copy of *Risc User* magazine.

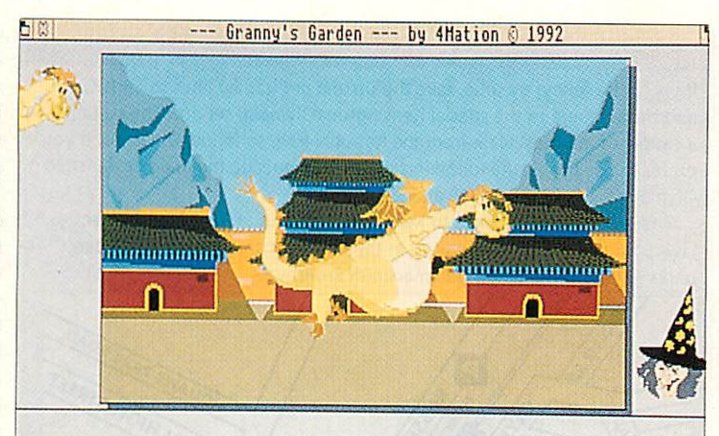
Ian Copestake Software also has IDE hard disc systems on offer and IdeA'92 is the name of a new range of high speed interfaces. Another attraction is *ColourSep*, a 24-bit colour printing package for mono and colour printers which uses multi-pass printing. It can be used to produce full-colour printouts from any printer which can take coloured inks, ribbons or toner.

Ace Computing also has a new printer product, a driver for Risc Os 3 which uses the black ink available in the HP DeskJet 550C to give high-quality output.

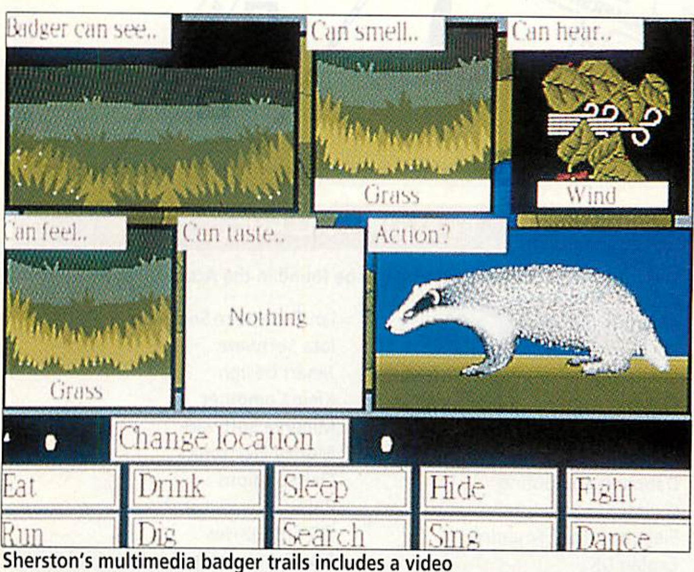
Making its debut on the Cumana stand is the 500 Series, a new range of high performance CD-Rom drives. *EasyShare*, which allows groups of machines to share SCSI devices such as CD-Rom and hard drives, will also be demonstrated, along with *EasyPrint*, a new utility enabling a printer to be added to an *EasyShare* system.

As well as its new resource materials, Oak Solutions will be demonstrating Level 4 Release 2 of *ClassNet*, which enhances the performance of an Archimedes network quite considerably. Along similar lines is a suite of programs from The Advisory Unit: Computers in Education. The Archimedes Network Manager Utilities are for managing Level 3 and 4 networks and enable a large number of users to be added in one action.

Jenart Design is known for manufacturing protective computer dust covers. However, at BETT it will also be showing a product called Wrist Support, which helps alleviate painful keyboard-related disorders.



Granny's Garden grows into a Risc OS application



Sherston's multimedia badger trails includes a video

WIN AN A5000

To coincide with the BETT show, Acorn is running an easy-to-enter competition and the prize will be a shiny new A5000 computer system, worth £1650.

Entry forms will be available from the Acorn stand at BETT. Simply circle the correct answers and take the form along to the information desk on the Acorn stand. If your name is the one pulled out of the hat at the end of the show, you get the A5000.

SOFTWARE

Although many visitors go to BETT to look at hardware and peripherals, the majority are there for the software and among the launches at this year's show are a number of new Risc Os word processors. *Wordz*, from Colton Software, has many powerful features but is, in essence, easy to use.

Icon Technology has a new version of its top-of-the-range *TechWriter* and Minerva complements the popular *PrimeArt* with *PrimeWord*. Cleveland Educational Computing Centre has *Clickword* for predictive typing and better spelling, plus database and spreadsheet entry. In addition to its word processor, Colton will also be showing the latest version of its integrated spreadsheet, *Pipedream* and a useful book called A Teacher's Introduction to Spreadsheets. Minerva also has CAD packages *Cadet* and *ProCAD*, which is brand new, on view.

Still on the words plus design theme, *BookMaker 2* from Resource is a DTP program for creating storybooks, magazines, illustrated poems and so on. Graphics and text can be manipulated and the package includes a wide selection of ready-made pictures.

Electronic Font Foundry, which produces high-quality outline fonts, has a new one, called Primary Cheynes, designed to help young children read and write. And if you're on the lookout for freebies, a large poster showing over 500 different fonts is available from the EFF stand.

DataPower from Iota Software is, as the name suggests, a powerful database with a straightforward form designer and many easy-to-use functions. Created files are compressed, so they are small to store, but accessing them again is fast. Datahandling software, in the form of the *DataSweet* family, can also be seen on the Kudlian Soft stand.

Although in terms of formats it has lately been diversifying, Longman Logotron maintains its committment to the Acorn platform with applications such as its spreadsheet *Eureka*, the *S Base* programmable database and the graphics processor *Revelation ImagePro*. It will also be showing recent upgrades to *Magpie* and *Notate*, and previewing *PIMS*, a primary school admin package.

4Mation has responded to popular requests and produced a version of the original BBC adventure program *Granny's Garden* for Risc OS machines. It will also be demonstrating the strangely named *Noot*, which displays animated pictures when you type in certain words (files currently available for this package include *Farm*, *Power* and *How It Works*), plus *Chatter*, a low-cost communications program, and enhanced versions of *Snippet* and *Vector*.

There are so many pieces of software on the ESM stand, its hard to know where to begin. *Seelinks*, for instance, is a range of database programs which teaches pupils the techniques of datahandling. The topics covered are transport, ourselves and pond life. Meanwhile, *WorldMaker* is a modelling package which offers children a way of exploring the world around them. Also on view will be Archimedes versions of *Kid*

Pix, Podd, Bookstore and *An Eye For Spelling*, plus *Time Traveller* files on *The Victorians, Trade, Industry* and *Expansion* and *The Making of the United Kingdom* and a variety of *Desktop Folio* curriculum packs.

For Welsh-speaking IT users, ESM has Welsh versions of *Folio* for Archimedes, *Desktop Folio* and *Bookstore*, while the Microelectronics Education Unit Cymru is exhibiting a history program called *Drovers*, a pack on IT in Science and *Iolo* which helps young pupils learn Welsh using a Concept Keyboard.

Oak Solutions is another company with an enormous list of new releases, particularly courseware products, which between them offer something for each key stage, especially in relation to the history National Curriculum. Created using the *Genesis* authoring package, *Abbeydale Industrial Hamlet* is a case study of the initial growth and subsequent decline of small-scale 19th-century industry.

Oak's *Viking Invades* introduces the role Vikings played in this country's development, while Cistercian Abbeys enables users to investigate a typical abbey and discover what it was like to live there. *Primary Nature* covers pond life, hedgerows and food chains and *Letters* uses sound samples, games and animations to help children who are learning to write to explore the alphabet.

At last year's BETT show Topologika demonstrated *ScreenTurtle*, its ambitious Archimedes Logo program, and this year it will be previewing a multitasking version, which is definitely worth looking at.

While you're there you can also see a multitasking version of the art and maths-based Imagine, plus *Freddy Teddy* adventures *In The Zoo* and *Balloons*, *Navigator* for exploring maps and *DataGraph* which, funnily enough, draws graphs. The Advisory Unit for Microtechnology in Education is also publishing an Arc version of its *Primary Logo Pack*.

Sherston always has something exciting and new for the BETT show and this year its *Badger Trails*, a multimedia simulation about badgers which comes with the usual comprehensive support material and a specially produced video. Also on show will be the first titles in the *Playbook* talking books series and a primary art package. Kudlian Soft also has a new painting program, called *Splosh*.

Clares has products for just about every area of the curriculum, from art (*ProArtisan 2*) and music (*Rhapsody 3*) through to maths (*Schema 2* and *Plot*) and even astronomy (*NightSky*). If you're interested in gazing at the heavens, do visit the Spacetech stand and investigate *Weather Desk*, a multitasking weather satellite and image gathering system.

As far as CD-Rom goes, you can be assured there will be more discs around than ever before, particularly those which run directly under Risc OS and don't require the PC Emulator. Cumana will be demonstrating its extensive collection and Cambridgeshire Software House has the CD-Rom version of its cross-curricular *Frontier 2000* (look out for this company's primary memory game program *Gemini*, too) but for a preview of the excellent discs currently being developed under the Government-sponsored CD-Rom scheme, find the NCET multimedia stand.

My World 2, the latest version of this acclaimed framework program, and *Optima*, a versatile package for linking words, pictures and sounds, will both be launched at BETT by Northwest SEMERC. The Expanded Keyboard and the Oldham Overlay Keyboard, both of which are designed for users with poor motor control or learning difficulties, will be on display, too.

Also in the Special Needs Village is Widgit Software, which will be showing *Choices*, another framework program. Based on an extensive library of still and moving images, this package is designed to encourage children to explore decision-making and selection processes.

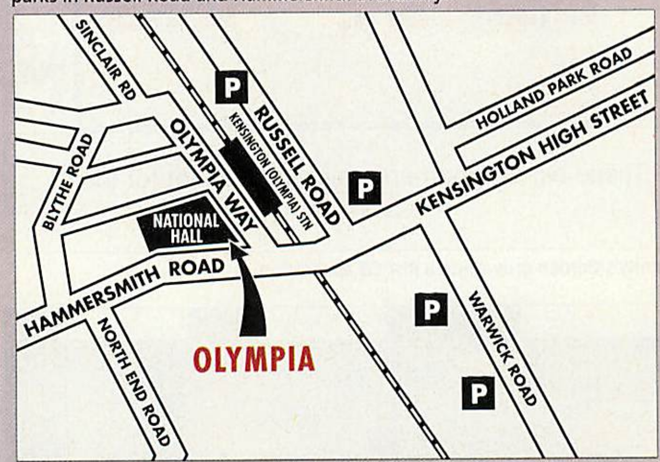
Brilliant Computing is launching *Smart Alex*, designed to encourage users to develop their vocabulary and reading skills, plus *Look and Listen*, which teaches pupils to differentiate between sounds. Road safety officers advised on this program and Appian Way worked with the police force to produce another launch, *Stranger Danger*.

Finally, to get a flavour of the range of educational software available, go along to the AVP stand and pick up a catalogue covering more than 20 different curricular areas. And don't forget: most companies will happily give an on-the-spot demo of any program that catch your eye.

HOW TO GET THERE

If you're travelling by tube, take the District or Picadilly lines to Earls Court and then change to the special Kensington (Olympia) service. The station is a couple of minutes' walk from the National Hall, so follow the signs. If you prefer to use buses, the following routes stop outside the main entrance to Olympia: 9, 10, 27, 28, 31, 49 and 391.

There are BR connections to Kensington (Olympia) from Manchester, Liverpool and many major towns in the Midlands and there are NCP car parks in Russell Road and Hammersmith Broadway.



IN ACORN VILLAGE

The following companies' stands can be found in the Acorn Village:

4Mation
BBC Acorn User
Cambridge International Software
Clares
Colton software
Computer Concepts
Dabhand Computing
Digital Services
Electronic Font Foundry
Explan UK
Hampshire Microtechnology Centre
HCCS & Allied Interactive
Ian Copestake Software
Iota Software
Jenart Design
Klein Computer
Minerva Software
Morley Electronics
Oak solutions
PRES
QD Enterprises
Risc Developments
Spacetech
Wild Vision



Who says learning can't be fun?

Looking for something with less zap and splat for your children this Christmas?

Sherston Software has a range of software that is both fun and educational to keep children of all ages meaningfully entertained for hours on end! Just take a look at some of our exciting titles for the Archimedes range!



The Crystal Rain Forest

Age Range 8 - 11 yrs

Our best selling adventure ... it's an education!

The planet of Oglo is in big trouble. Its last remaining rain forest is rapidly disappearing as the Cut and Run Saw Mill Gang cut their way through it for profit and greed. Only the children can help by tracking down the magic crystals deep in the heart of the rain forest! Full of stimulating and educational challenges.

'a fantastic product ... outstanding ... educational as well as entertaining." *Archimedes World*





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Use the mouse to select a line to change.

Arcventure I ... The Romans

Age Range 9 - 11 yrs

An adventure back in time to Roman Britain!

It's not every day children get to play at being Indiana Jones, and it's not every day they find themselves back in Roman times trying to find out just what it is they have discovered while helping with an archaelogical dig. Children get six chances to travel back in time in this entertaining and educational adventure.

'... a wonderful way to experience history ... a high quality software package. " *Acorn User*



£29.95 + VAT (£35.19)



Arcventure II ... The Egyptians

Age Range 8 - 9 yrs

Time travel and adventure for 8 and 9 year olds!

The adventure of a lifetime for children when they find a series of mystery objects in an archaeological dig in Egypt and are whisked back in time to try and discover just what they have found. Six mystery objects, each with its own adventure back in time make 'The Egyptians' great value for money. Great fun and educational too!

• NEW IN OCTOBER 1992 • NEW IN OCTOBER 1992 • NEW IN OCTOBER 1992 •



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Animated Numbers

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Number fun for young children!

Watch the numbers from 1 to 10 come alive in this beautifully animated program to help young children get to grips with simple number concepts. Three fun filled activities that will entertain and amuse youngsters over and over again. The perfect program to introduce your child to numbers and the computer at the same time!

' ... a program with both entertainment and real educational value... " *Child Education*



£21.50 + VAT (£25.26)

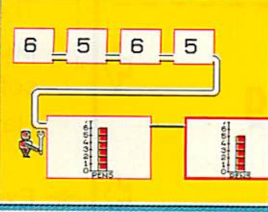
Connections

Age Range 5 - 7 yrs

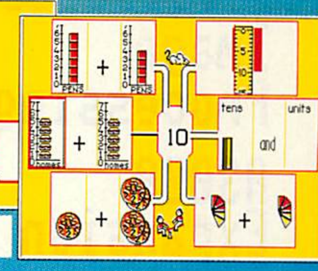
An award winning approach to Maths!

Designed to help young children with their maths and number work, Connections won the prestigious GOLD award in the Educational Technology Awards 1991. Numerous maths activities and four levels of difficulty make Connections suitable for a wide range of young children.

' ... thoroughly entertaining ... very useful ... excellent value for money. " *The Times Ed.*



£27.50 + VAT (£32.31)



Christmas Allsorts

Age Range 7 - 70+ yrs!

Treat yourself to some Christmas clip art!

A colourful collection of high quality Draw files including toys, food and drink, decorations, greetings, people, animals, trees and of course reindeers and sleighs ... everything you could possible need to create your own unique Christmas design. There are even six full scenes to build up your Christmas pictures on!

• OUR BEST SELLER AT THE ACORN USER SHOW 1992! •



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Access VISA

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DESKTOP VIDEO

ON THE MENU TODAY...

Wild Vision

Info

High quality expansions for the Archimedes, A5000 and A3000 from the specialists in Desk Top Video.





Real Time Colour Video Digitisers

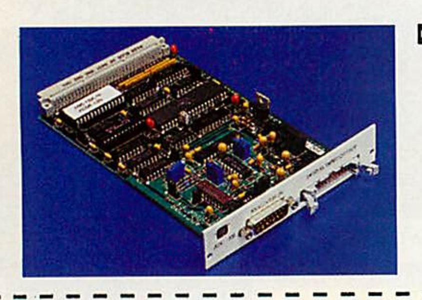
Use video or TV as a source for computer images. The popular Hawk V9 digitiser is the ideal solution wherever you need photograph-like sprites in colour or monochrome for DTP or Art applications. Wild Vision combine quality and performance with value; real-time colour digitisers available from £199.00.



Superimposing text, graphics or animation onto video

Simple, with a *genlock and overlay card*. The Chroma range is your route to creating and recording video masterpieces. Just let the film - and your imagination - roll! Chroma Genlock range from £215.00.

PAL encoding units with optional multiple display facility also available.



Data acquisition

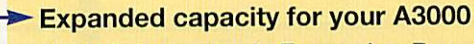
The Archimedes is the ideal vehicle for the measurement and analysis of analogue signals such as sound or ECG readings. Wild Vision's high speed 12-bit analogue to digital converters are used in medicine, research, defence, and incorporated into turnkey systems. ADC1208 from £560.00.

Image Processing

Image Processing and Analysis

The Hawk V12 video framestores are designed specifically for image processing on the mighty Archimedes. With Foster Findlay's ArcImage software, a powerful image processing and analysis system is created. Hawk V12 from £1,990.00.

A3000 Expansion



Expanded capacity for your A3000

Wild Vision's sturdy Expansion Box allows you to use standard Archimedes expansion cards with your A3000; up to three cards may be fitted at once. A3000 Expansion Box £139.00.

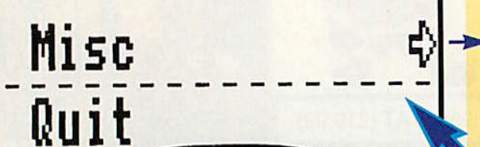
Misc

Contact Wild Vision for full details and price information on the above hardware and recommended complementary software.

Quit

Wild Vision, 15 Witney Way, Boldon Business Park, Boldon Colliery, Tyne & Wear NE35 9PE, Tel: 091 519 1455, Fax: 091 519 1929

Prices exclude carriage and VAT



WILD VISION



CRYSTAL CLEAR

Claire Johnson looks at the Crystal Rain Forest, Sherston's educational extravaganza that covers almost everything

I hate programming and computer games that require me to shoot missiles at alien craft, mainly, I admit, because I am not very good at either and I lack the patience to become any better.

Teaching programming skills is also difficult, although it is required as part of Information Technology in the National Curriculum. It usually becomes rather boring and not very useful.

So finding a piece of software that required me to do some problem solving, Logo programming and that provided a great adventure as well was a real bonus. Sherston Software's *The Crystal Rain Forest* does all that and more.

The adventure game is set on the planet of Oglo, which is in a lot of trouble. The rainforest is being plundered and contaminated by the Cut and Run Gang. The King is dangerously ill and can only be saved by us finding magic crystals hidden deep in the forest. The gang want to save their profit margins and will do their best to stop us.

First we have to visit Bridgetown and find two pieces of a map and a professor to help us. The pack provided contains a map of the town and travelling around town is by means of 90° turns and forward moves – the initial introduction to Logo-type turtle graphics.

There are various problems to solve before we find the professor. The laboratory in the pyramid is reached by guiding robots through mazes using commands such as forward, jump and turn. Sometimes the robot has to be programmed before it will move and we didn't need to be too accurate at this stage.

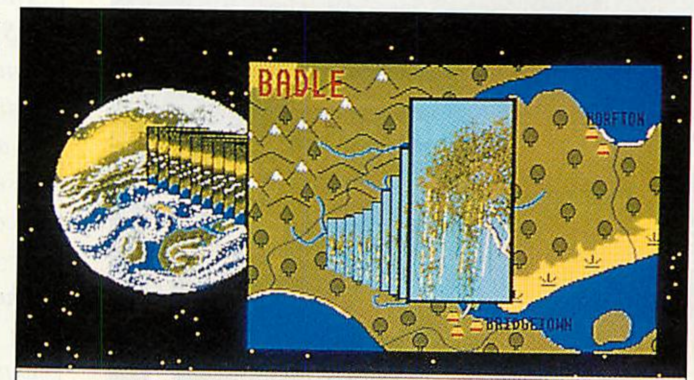
Esme the gardener (found at the station, not in the garden) needs help mending bridges by transforming and floating different shapes down the river. Herbert needs help putting leaves into bamboo carts that change shape and have to be filled exactly.

In both cases pupils have to use their powers of estimation to decide what changes to make while the shapes and packages are moving on screen. Even I found that difficult and would like to have been able to print the screen out to enable pupils to do some work away from the computer. The documentation does include some work cards but not exact replications of the screen. Maybe we need a pack of ideas and photocopyable workcards to go with the software?

Problems solved, we discover the professors' secret laboratory. To get in, the electronic circuitry that works the door has to be fixed. This is achieved by joining terminals and is the first time we are introduced to angles.

Now we find the professor, a computer and a boat. The professor, not surprisingly, is also ill and we have to go into the forest to find the crystals. All the problems in the forest involve Logo-type solutions. Guiding the boat, mending rope bridges, making nets to catch barrels of poison all involved writing short pieces of program, including the use of REPEAT and END.

Testing your procedure at each stage is encouraged and errors are immediately obvious. Finally the crystals are found and then dropped by the monsters. Luckily we can design our own on the computer and save the planet.



In the Crystal Rain Forest, you can save the planet and learn to program too

Crystal Logo can be used on its own from now on. It has distinct advantages over other versions of turtle graphics. All the programming is done by pressing buttons, so no spelling mistakes are possible.

Writing named procedures is encouraged by the software and you can colour in your patterns, print and save them. The documentation includes an easy to use guide and the only thing I wanted to be able to do and couldn't was to produce work cards again.

Working through the adventure (supplied with two levels of difficulty) forces pupils to work to IT National Curriculum standards up to level 6 and enjoy it too.

Transferring skills to full Logo or Basic programming should be easier and the graphics and content could lead you in all sorts of curricular directions. My only complaints were the noises (which the pupils loved) and the mouse jumping to the side of the screen after each selection; done to encourage pupils to read the screens, not just click, but I found it irritating. Even so, this is a piece of software I wouldn't be without in any junior or lower secondary IT software library.

NATIONAL CURRICULUM

The Crystal Rain Forest provides numerous teaching opportunities in other curriculum areas. In each document work up to and including at least Level 6 can be covered.

- Mathematics: Work involving symmetry, estimation, use of angles, rotation and translation, reflections, co-ordinates, distances, shapes and paths, foreign currencies, use of symbols to stand for unknowns and developing a series of commands to produce shapes.
- Science: Following written instructions and diagrams, recycling, respiration and life processes, genetics and evolution, human activity producing local changes in the earths's atmosphere, exploitation and its harmful effects, global energy resources and their limitations.
- Geography: Following a route, measuring distances between two points, comparison of localities, changes to locations by human actions,weather conditions, erosion, river systems, vegetation, climactic and environmental conditions, the effects of removing natural resources, renewal of damaged landscapes and special protection.

While the above list is immediately and obviously covered by the software, other areas in art, history and English are suggested in the accompanying teachers guide and areas of the curriculum such as citizenship and health education could be linked in a thematic project.

PRODUCT DETAILS

Product: The Crystal Rain Forest
Supplier: Sherston Software Ltd, Swan Barton, Sherston , Malmesbury, Wiltshire SN16 OLH
Price: £39.95 (single user); £79.90 (primary site license); £119.85 (secondary site license)

SCSI CD ROM the collections from Morley

Morley Electronics are pleased to announce their new CD ROM bundle for the Acorn ARM powered range of computers. The system comprises of a Morley 16 bit SCSI card, a high quality externally cased CD ROM drive, a set of stereo speakers all cables necessary and a choice of four different collections of CD ROM discs.

The CD discs themselves are all RISC OS format and require no use of a PC Emulator whatsoever. They range from a disc which is crammed full of clip art to an encylopeadia of bugs, slugs and insects with full motion video clips in Acorn !Replay format.

The information on all of the discs can be accessed directly or if desired exported for use in other software. For instance the sound samples on the Grooves disc can be exported straight out to music packages for re-arranging.





INCLUDED AS STANDARD
CD ROM Mechanism
16 bit Morley SCSI Card
All Cables
Stereo Speakers

COLLECTION 1
Grooves
Creepy Crawlies
Image Warehouse

COLLECTION 2
Grooves
Creepy Crawlies
Image Warehouse
Hutchinsons Encyclopedia

COLLECTION 3
Grooves
Creepy Crawlies
Image Warehouse
D.O.L.W.

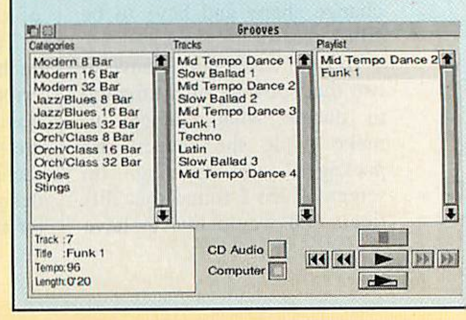
COLLECTION 3
Grooves
Creepy Crawlies
Image Warehouse
Hutchinsons Encyclopedia
D.O.L.W.

Grooves

This is a unique music CD ROM featuring 100 professionally created clips of music. The music varies from classical to funk and the majority of clips are available in 8, 16 and 32 bar samples. The pieces themselves vary from short presentation strings or "musical dingbats" to compostions lasting one and a half minutes.

Using appropriate music software it is possible to build creative 'tunes' demonstrating different musical styles. All the clips come in ready to use formats and users can preview the tracks by using a special application in which an animated jukebox selects and plays the audio versions of the clips.

All samples can be exported as Sound Samples, Modules or as !Replay sound file. All are royalty free for non-profitable use.



Creepy Crawlies

A complete world of bugs, beetles and spiders engulfs the screen right in front of you. This new disc produced by Media Design Interactive has been formed specifically for the RISC OS format.

Offering an exciting introduction to the fascinating biology of these creatures. The information is in the form of text, pictures, narration/voice over and !Replay video material produced by the worlds leading biologists. A very useful feature is that the text descriptions can be set to display for either Key Stages 2/3 or 1/2.

Text, Sprites, !Replay frames and narration can all be exported directly for use in other programs.

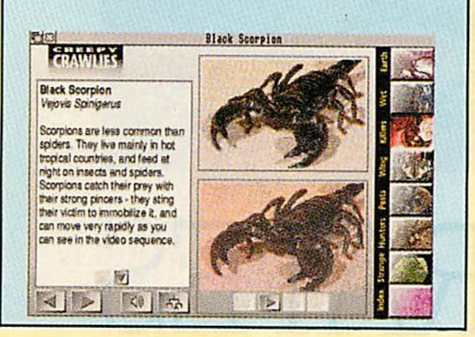


Image Warehouse

The colour Image Warehouse is a vast selection of professionally created high quality images ideal for use in DTP, presentation and artwork in general.

The warehouse consists of five main sections as follows:

Artwork
Scans
Textures
Clip Art
Backgrounds

All images are in Sprite format in large and small Modes 15,28 perfect for use on all Acorn computers and monitors from the A3000 upwards. All are royalty free for non-profitable use.

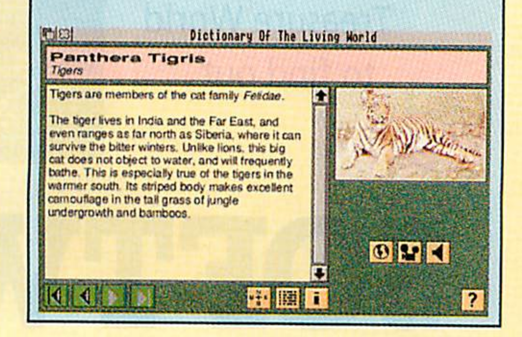


Dictionary Of The Living World

This multimedia encyclopedia of Life on Earth incorporates text, pictures,sound, and !Replay video scenes. More than 2500 text entries are supplemented with over 1000 pictures, 100 animal sounds and 100 full motion video clips.

When a small picture such as the one below appears, the user simply double clicks in the picture and it is immediately displayed full screen in full 256 colours.

Ideal for educating students from 10 years upwards the Dictionary of the Living World can teach about the biology of life. All of the sprites and text files can be exported for later use and the !Replay video files can also be shown in isolation.

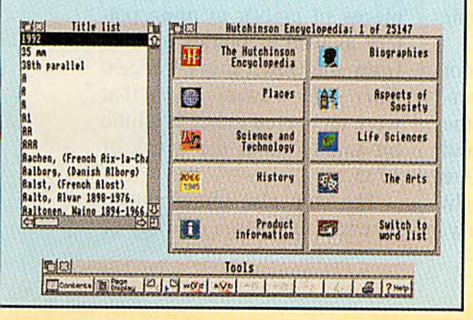


Hutchinsons Encyclopedia

This exciting CD ROM version of the Hutchinson encyclopedia is an up-to-date reference for vast amounts of informations available in seconds.

The package is fully RISC OS compliant and has over 25,000 entries and 7,500 biographies listed in its information. Searches can be carried out quickly and easily and then the results fine tuned even further by allowing further searches to be carried out on those that were successful from the first.

A very useful feature of the software is that all text and sprites can be exported from the software for use in projects or reports that you might be working on.



Individual Prices

CD ROM Collection 1	£649.00
CD ROM Collection 2	£729.00
CD ROM Collection 3	£769.00
CD ROM Collection 4	£849.00
CD ROM drive (External)	£439.00
CD ROM drive (External) & SCSI interface	£489.00
CD ROM drive (External) & cached SCSI interface	£539.00
CD Caddy	£6.25
External Loudspeakers	£21.28
RISC OS CD ROM DISCS	
Creepy Crawlies	£99.00
Grooves	£59.00
Image Warehouse	£59.00
Dictionary of the living world	£175.00
Hutchinsons Encyclopedia	£99.00
Frontier 2000	£175.00
Revelation 2	£139.00

CD ROM collections are suitable for all Acorn computers with 16 bit expansion slot. Some CD discs require 2MB RAM minimum and a multiscan monitor is recommended. All prices exclude VAT and carriage. E&OE Specifications subject to change. All trademarks acknowledged.

the best in multimedia from Morley





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What do silver ducatoons, hydraulic rams and the A3000 have in common? Mathew Tizard went to Treasure World to find out . . .

SOFTWARE PIRATES

On a wet day in December I found myself entering another world through the back end of a galleon which protrudes in a surreal manner from Great Yarmouth sea front. Inside, I met Ray Maidstone, the technical wizard behind one of the most interesting uses of Acorn machines I have yet discovered.

He is using 20 A3000 machines as the heart of a 'theme museum' to drive a sound and light show like no other. The theme is treasure, real treasure, and the man who started it all is the intrepid John Rose, who you may remember from his appearance in the national newspapers.

He is the man who since the 1970s has scoured the world searching for lost treasure. He goes to lakes in inactive volcano craters in the Philippines. He skims the surface of shark-infested waters in a microlight aircraft scanning beneath the surface with a proton magnetometer. That sort of thing.

And he's good at it. So good that he has made a fortune recovering treasure from various sites around the globe. Recently he felt the urge to give some of his finds wider exposure and so tentative plans were made for a museum to house them.

Enter our technical body, Ray Maidstone. Ray constructed his first transistor radio at the tender age of five so he seemed a good choice when it was decided to add some lighting effects to the museum. Once he was involved though, he could see the potential for something much more than just a museum. With him as a catalyst along with a creative team came the advent of Treasure-World, which goes way beyond what anyone originally intended.

'When we decided to add some special effects, John wanted to use PCs, but I was adamant that the Archimedes was the machine for the job,' said Ray.

Now, a space the size of six three-bedroom houses has been transformed into Norfolk's answer to Madame Tussauds, only with a twist. The dummies are fitted with servomotors allowing them to move and talk, in a method known as 'animatronics'. As you walk from scene to scene, they narate the stories behind John's finds, the excavation process of a North Sea shipwreak and the early history of diving to name but a few.

All these scenes are computer controlled from the movement of the dummies faces to the formidable hydraulic rams which effortlessly slide around the objects inside them; and the computers that make it all happen are of course the A3000s.

WHAT TO SEE

First I investigated Treasure World as the public would see it before taking a look behind the scenes. The whole show lasts about an hour and the computerisation of the complex means that effectively, one person can run the whole museum from the souvenir shop at the entrance.

All they have to do is 'boot up the building' and the supervisor machine wakes up the ancilliary computers, and times the shows. At any one time, a single computer might be speaking a commentary, moving the eyes, eyelids, lips, jaws and head of a dummy, playing music, showing slides, driving a video recorder and shifting the scenery about.

'We had some teething troubles with the hydraulic rams.' Ray told me.

'In the early days, they would fire of their own accord and swipe large chunks out of the wall. We had to fit extra steel joists and a hardware connection which made it impossible for them to move unless they were firmly told to do so.'

By the time you reach the end of the museum, everything inside has been put into its proper context and filled with meaning. There is over one million pounds worth of genuine treasure inside, under Fort-Knox-like security, ranging from a collection of silver and gold ducatoons (the original pieces of eight), to ming pottery as well as bottles of wine from the Dutch ship *t'Vliegent Hart* (*The Flying Hart*) that were recovered intact, if a little bit smelly, from the wreck of 1735.

The ship also turned out to be carrying a large quantity of

silver coins which were not detailed on the cargo manifest. The smugglers' secret was out, 255 years later.

Simon Clay, of *Atelier* fame, is responsible for the software which keeps the whole shabang running smoothly. Indeed it was his gadget to control relays using the printer port which originally started the creative ball rolling.

He also designed the editing software which brings the scenes to life. Information is entered into time slots which detail those servos, relays and samples you want to trigger and for how long. After that, the computer takes over. To choreograph a scene by hand, from scratch, is a painstaking process, and takes something of the order of 40 man-hours.

Once it's done though, the results are astonishing. Get the lighting and music right and the moving, talking dummies are really quite eerie and some of the special effects and artwork in the scenes are breathtaking. Attention to detail is apparent everywhere; some of the props inside a submarine scene are actually from the *Ark Royal*.

As Ray said, 'the whole project is very much improvised as we go along. People are always having ideas in different areas, and if they are technically possible, we make them happen. The place is far more than the sum of the people involved.'



Great Yarmouth's Treasure World would be sunk without Acorn machines

At the moment Treasure World is only two-thirds finished. Yet to come is the shipwreck-theme restaurant which will also be full of animatronics, more computerised scenes and some new, interactive features.

'Why have museums with static display cases? We want a 21st-century museum where the public can get their hands on things, push some buttons and really get involved.'

Ray has plenty of ideas for other features and effects which will doubtless find their way into the museum somewhere before long, if he can keep the crowds out for long enough.

'The great thing is that the public can't get enough of it. I mean here we are, out of season in December, and we're full to bursting. They're effectively paying our development costs already.'

The whole concept of the museum is incredibly ambitious – they shipped over the original microlight aircraft to use in one scene – and yet the feverish labours of all involved over the last year has made it work incredibly well. If you are ever in the area, make a detour for Treasure World.

By the time you've been through the museum you will know an awful lot more about shipwrecks and the men who find them than when you went in. What's more, you will know just how it was all done.

As for John Rose himself, well he is now a complete Acorn convert and has traded in his PC for an A5000.

WHERE TO FIND IT

Treasure World is currently open at weekends only, and is located on Great Yarmouth sea front, 69 Marine Parade.Tel: (0493) 66385. The nearest BR station is Great Yarmouth.

TECHNICALLY SPEAKING

A3000s were the natural choice for the project from the start, because of their multitasking abilities and sheer power and also because of the attractive price, the easily accessible mother-board and the ease with which the hardware can be customised by someone with Ray's expertise. The whole of the Treasure World show is co-ordinated by a supervisory computer and a fleet of other machines (one for each scene) which are instructed when to start and stop their scene. If for any reason a scene fails to begin on cue, the operator can turn a key manually to trip the switch. In that case the supervisory software reschedules all the other scenes so that they absorb the delay. This feature was essential when you consider that there are up to 18 people inside each scene who have nowhere to go if the next scene is full up.

To check that everything is in order, the supervisory machine takes the 'pulse' of the other machines (a relay which flips on and off once a second in each box) via an imaginatively-used four-joystick interface. The whole system has to be pretty robust and have failsafes like this because the mains electricity supply at Great Yarmouth has more spikes than a hedgehog convention – spikes of up to 30V. The fact is that the computers are driven to their limits. 'They couldn't do another thing if you asked them to,' according to Ray.

Acorn have been fairly stunned that he has been doing what they regard as the impossible with their hardware, and with very good reason. There is little left of what you or I would recognise as a conventional A3000 in the scene-controllers. The motherboard is ripped out of the casing and given an extensive overhaul. All but one of the add-ons have been custom designed by Ray. First of all, a heavy-duty power supply is installed to replace the standard one which is unable to cope with the spikes. A stereo hi-fi board is added, to provide quality sound for the commentaries and music, and the output of this goes to a pair of 140W amplifiers which, if required, are capable of vibrating the floor! Phasing effects can be achieved with the board to get the sound of a plane or a parrot flying by. The video output is boosted so that one machine can drive up to three monitors. The vertical pins for memory expansion are removed and the standard Ram is replaced by a permanent 4Mb. Previously, in such a wired-up building, the pins simply acted as ariels and introduced noise.

Both internal podule slots are used of course. In one slot is an 8Mb Eprom card, and in the other is what can only be described as a 'non-podule', in that it refuses to acknowledge its existence to the computer. Again, because of the unreliability of the mains, this is a necessity, and data has to be written to the podule 'raw'. The podule itself contains 32 output channels (easily expandable to 64 channels). The printer port becomes a 10-way input/output port which can drive a maximum of eight relays – perhaps triggering some of the three-ton hydraulic rams – or servomotors for facial and bodily movement of the dummies. The computers communicate via an intelligent system of handshakes. Along with each setup is a VCR, which currently holds all the visual sequences used during the scene. The VCR is driven very hard and has to have its own clean air supply to prevent frequent breakdown.

All the voice commentary and music for each scene is held in memory and soon the video will be as well. The VCR will be replaced with – wait for it – a 64-Mb Eprom board on which up to seven minutes of full-motion, full-colour Mode 15 video will be stored using JPEG or MPEG compression techniques. This will achieve Ray's impressive goal of having an the whole system running with absolutely no moving parts.

NEXT MONTH

BBC ACORN USER

HOW TO MAKE MUSIC ON YOUR ARCHIMEDES

Drum machines, Midi boxes, synthesizers, notation programs, sequencers are just a few of the bewildering range of modern computer music products Our new series will sort out the right set-up for your musical needs and shows you how to start making sounds. Don't miss part one!

FILES, FILES, FILES

Just what you need for those irksome files. Need to strip out control codes from text files? Want to sort out your sprite files? Then this could be the *BAU* program for you

ANIMATION IN ACTION

Pete Worrall goes out on location and teaches school children how to make their own films

IN BRIEF

This month we look at *Netview*, the program that allows you eavesdrop on your neighbour's station. We also take a peek at the *Rhythm Bed* drumbox, examine the pros and cons of flopticals and review *Impact*, the new database package

PLUS

DATAPOWER

Two years in the making, this new database from Iota software claims to take a novel approach to the age-old problem of data-storage. We put it to the test

THE FLOPPY FACTOR

What do you do when one drive is no longer enough? What are the upgrade options? And what about adding a high-density drive? All these questions answered in next month's look at the floppy factor

REGULARS

- All the latest news and views from the world of Acorn
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- Your letters and problems
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IN BRIEF

This month, among other things, we hack into digital music making, take a yacht around the world, and create books on the computer

DESKTOP TRACKER

Leading Edge, Northwood House, North Street, Leeds LS7 2AA Tel: (0532) 458800 £59.95

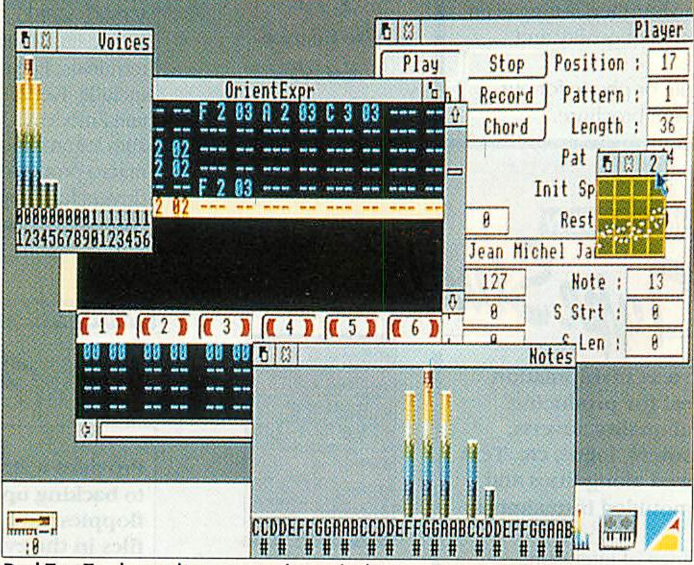
People who use computers to make music fall into two categories. On the one hand, we have 'musicians' who play real instruments, don't want to know any more about computers than they have to and like applications that use arcane musical notation to drive as much Midi gear as their second mortgages will allow.

On the other hand, there are 'programmers' who don't play instruments, like computers, don't like applications except those they write themselves and who 'just wrote this wicked bit of C that plays the whole of Beethoven's Ninth Symphony backwards.'

This is of course a rash generalisation and there are many groups of people who do not fall within its parameters. One such group is the 'Tracker Cult', a mysterious group of individuals who believe that music is best written by typing alphanumeric characters into something called *Tracker*, the latest incarnation of which has just been released.

It all started with a package called *SoundTracker*, written some years ago for the Commodore Amiga. This four-channel application was designed so that people could write tunes for games and demos quickly and without recourse to music theory.

It was a great success and, to this day, most tunes heard on the Amiga are written using it. When Archimedes computers arrived with eight-channel audio and sampling, it could only be a matter of time before some enterprising company put together a similar package to run under Risc OS. The company concerned was The Serial Port, which produced a popular proglet called *Tracker*. Much of its success is due to the facts that a) it's compatible with *SoundTracker* files ported across from the Amiga and b) source code for its playback routines is freely copyable.



DeskTop Tracker: cult programming at its best

As can be seen from any Archimedes PD catalogue, this has resulted in a vast library of *Tracker* and *SoundTracker* tunes just waiting to be dropped into games, demonstrations and spreadsheets with total disregard for composer copyright. (Jean-Michel Jarre makes quite enough money as it is. Discuss.)

Tracker is a 640K whole-screen application which displays eight vertical columns of numbers representing 'events' to be sent to the eight sound channels on the Arc. These may be 'notes' which define the start time and pitch at which a sample plays or 'commands' governing channel parameters (for example, volume, stereo position in headphones, or arpeggios).

Events are entered, edited and block-edited by keyboard and mouse and the screen also features a simple bar-type spectrum analyser along with buttons for file management, sample selection and so on. A *Tracker* song consists of up to 64 'patterns' containing 64 'events'. These are played in an ordered 'sequence' of up to 128 patterns.

OK, I thought A-series computers only had eight sound channels and now they tell me this sequencer's got sixteen! Do I have to buy another computer, or what?

Nothing that drastic. The most impressive feature of *DeskTop Tracker* is that it can play sixteen sounds simultaneously using a process called 'time division multiplexing'. This means that the program sends data a byte at a time from two tracks alternately to the same Archimedes sound channel. This obviously produces a reduction in sound quality, which could be acceptable given good quality samples.

The other main addition to the package is an extended list of effects which can alter the sound of each sample as it plays. These effects include: three note arpeggio, portamento (tone bending),vibrato, tremolo, phase distortion, stereo panning, fades and sample retriggering (as in 'n-n-n-n-ninteen' and 'hu-hu-hu-how long'). Up to four of these effects can be applied to each event simultaneously, which gives greater compatibility with *SoundTracker*.

As the name implies, this version has been written to run within the Risc OS desktop and probably required a fair amount of rewriting to get there. This being the case, the authors have taken the opportunity to restructure the package in a number of ways. The most obvious of these is the way in which it's been split into several modules which can be run individually according to the needs of the user.

This means that when you call *DeskTrkr*, what you get is a fast 320K application which just shows the data columns and has a pop-up panel called 'The Player' to control edit and playback.

Versions of DTT are already available and the full release is expected by the end of January. This will include a Midi playback module compatible with most Acorn Midi cards. The pre-release version I used was somewhat unwilling to run on smaller machines, but the final version is expected to run easily on a 1Mb Risc OS 2 machine.

Tracker is a program that seems to appeal to a particular group of enthusiasts and if you like it, you'll probably like *DeskTop Tracker* even more.

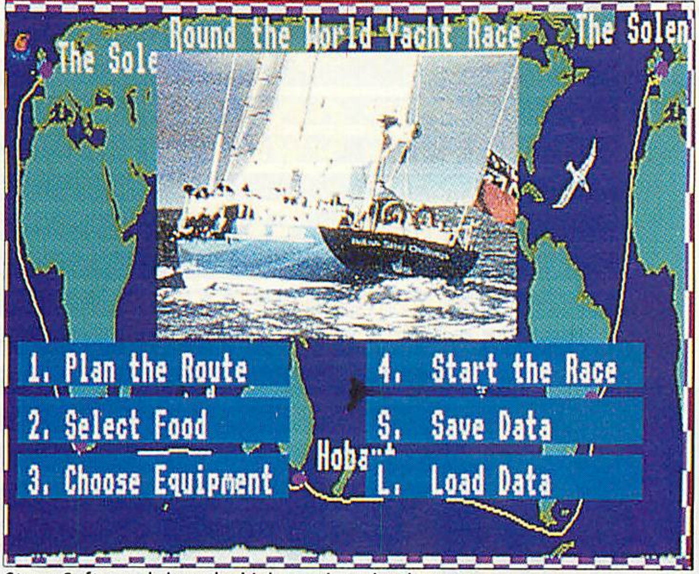
Richard Garrett

NEW FEATURES

- Up to 16 tracks (16 voices simultaneously) using software multiplexing
- Up to four simultaneous effects on each sample
- Extra Amiga *SoundTracker* compatibility
- Full Risc OS desktop operation
- Faster play routine; needs less processor time to run
- Modular design
- New compact file format

ROUND THE WORLD YACHT RACE

Storm Software, FREEPOST, Sherborne, Dorset, DT9 3NN Tel: (0935) 817699
£34.99



Storm Software brings the high seas into the classroom

Ever wanted to try your hand at emulating Chay Blyth, Sir Francis Chichester or even the great Sir Francis Drake himself? With Storm Software's *Round the World Yacht Race* you can do just that, in a simulated way, of course.

Commissioned by Britsh Steel, Storm has recreated a 28,000 mile, circumglobal yacht race based closely on the British Steel event. Unlike the Whitbread event, the British Steel race goes the 'wrong way'; against both prevailing winds and currents.

The package comprises a disc, an A5 handbook, a study guide and a world map showing prevailing winds. The disc offers two versions of the program: a single group version where the computer controls the other nine boats or a version where up to ten groups of children can compete with each another.

Whichever version you choose, children must plan, for each stage, an outline of the route, 'provisions' for the yacht and what additional equipment may be needed. Each of these options, including that of saving data or loading data from past sessions, are available from the opening menu screen. Routes must be plotted with the mouse, taking into account the prevailing winds. Provisioning the yacht requires the most maths. The crew must be given a balanced diet which must be calculated against the target calorific total for the crew.

Progress on the sea journey is determined by the choice of additional equipment, prevailing winds, good diet and children's own efforts at sailing a straight course.

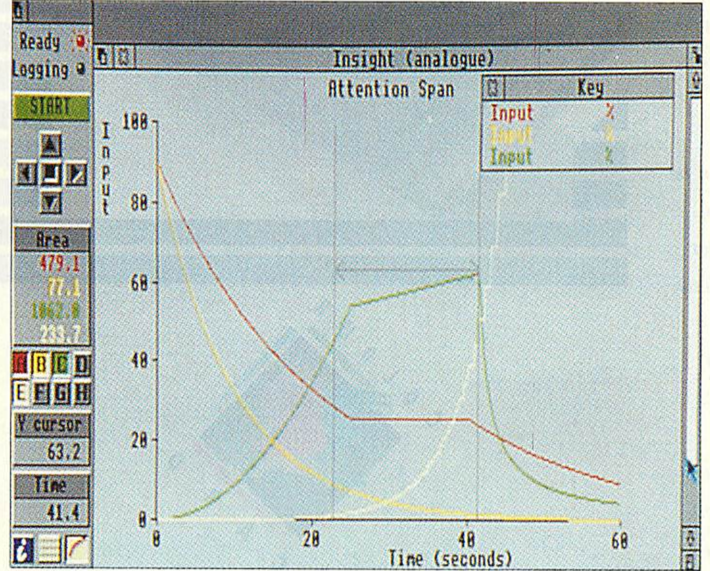
I suspect that this program is ported from a PC platform, as it is only Risc OS coexistent (not compliant) at best, and better use could have been made of animation and digitised images and sound. It could support a number of related topics; there are quite a few National Curriculum links: Maths ATs 1/2 & 4; Science ATs 2/4, and Geography ATs 1/4.

I doubt whether the package could sustain a topic in its own right; it would require a great deal of additional resourcing and preliminary work by the children. How many schools will be willing to part with £34.99 for a program of rather limited application?

Chris Drage

INSIGHT

Longman Logotron, 124 Cambridge Science Park, Cambridge, CB4 4ZS Tel: (0223) 425558
£69.00



Insight: real-time computer analysis of data in the classroom

When science teachers first saw the BBC micro, many saw revolution. They looked at all those sockets and thought 'yeah, you plug detectors in the back of here somewhere, press a button, and print the graph out over here . . .' Come the great day, students, liberated from stopwatch and thermometer, would sit back and observe as machines did all the measuring (properly).

The great day has been a long time coming. Manufacturers have produced numerous interfaces for the school laboratory and, with each one, a unique program to run it. The resultant plethora of software has discouraged many teachers from 'datalogging' altogether. Insight's two programs attempt to cut through this confusion by producing standard output from several different interfaces (SenseIt, LogIt, SaC and Philip Harris) within the reassuring confines of the Risc OS environment.

The first program, *Analogue*, uses input from sensors that detect temperature, voltage, light intensity and so on. In general use, it takes readings at timed intervals and draws a graph of what it receives. The graph can be a Y-T plot of up to four signals against elapsed time or a Y-X plot of up to three lines against output from a fourth sensor. Data can be uploaded from remote data loggers and 'one shot' Y-X readings can be triggered by hand.

Once a graph is drawn, a cursor can be moved around to show gradients, areas under the graph, ratios and differences between lines. Up to four additional lines can be drawn to show theoretical results, near fits, and curves derived from input. Unfortunately, theoretical curves can only be drawn after data has been received.

Insight's second component, *Digital*, is devoted almost exclusively to the analysis of Newtonian motion. It registers events when one of two switches is thrown and logs them in a table. It can also calculate time elapsed between switch changes, totals and averages and will even draw you a bar graph.

The programs have all the familiar strengths of a Longman Logotron package. They are easy to use, feel reliable, and have good export features (CSV, SID). Sadly, however, *Insight* has no facility for switches to trigger sensors (for example, pressure pads triggering evironmental sensors in response to animal movement) and limits cross-curricular use by ignoring common switch interfaces like the user port and the keyboard.

Gripes aside, *Insight* is a versatile program which could improve the experience of practical science for many students.

Richard Garrett

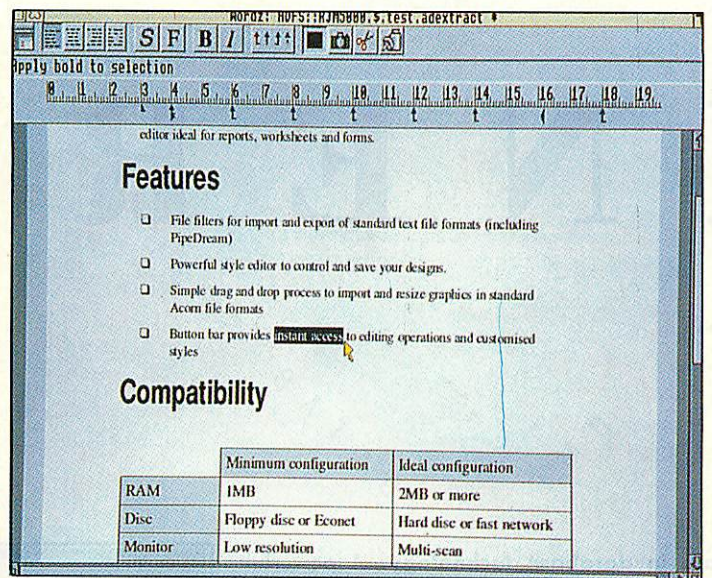
WORDZ

Colton Software Tel: (0223) 311881
£TBA

Take note; this preview version of *Wordz*, Colton Software's new word processor, is a very early release indeed. We normally wouldn't look at such an early alpha-release program but, as Colton dared to demonstrate it at the *BAU* Show, a little anticipation seems justified.

For a long time, the Archimedes didn't have a fully-featured 'conventional' word processor. *Edit* is a programmer's tool, *Impression* is a DTP package, and Acorn's very own *First Word Plus* failed inexcusably to be updated to a full Risc Os conformity. Colton's first attempt at word processor functionality was *Pipedream* and word processors – it's a spreadsheet really – don't come much more quirky than that.

But for a long time, those four programs were what most Archimedes users did their word processing with. Today, perhaps most notably with *EasiWriter* from Icon Technology, Archimedes users can now opt for a no-nonsense word processor. *Wordz* is the latest of this generation and it looks very promising.



Wordz is the first attempt at a fully featured Risc OS word processor

There are immediate comparisons to be made between *Wordz* and *EasiWriter*. Both have icon 'button bars', table editors, graphical abilities and support embedded text styles which can be edited remotely. However, there are fundamental differences; style application is more like *Impression* than *EasiWriter* and, unlike the latter, *Wordz* looks very pretty, complete with 3D buttons and borders and a very cute program icon.

From a company previously specialising in spreadsheets, the table editor was always going to be impressive and so it is. Adjusting tables by mouse-dragging them around appears to use some neat tricks from *Pipedream*. Resizing boxed table entries with coloured-in backgrounds is a relative doddle.

Pipedream loathers will be relieved to hear that the final version of *Wordz* will, like *Impression* and *EasiWriter*, adopt text selection and editing options and key short-cuts very similar to applications running under Microsoft Windows or the Apple Mac. A Microsoft *Word*-like drag and drop facility which by-passes the clipboard is also being considered.

I still have some worries about screen update speed; I'll be keeping a sharp eye on *Wordz*'s performance.

Ian Burley

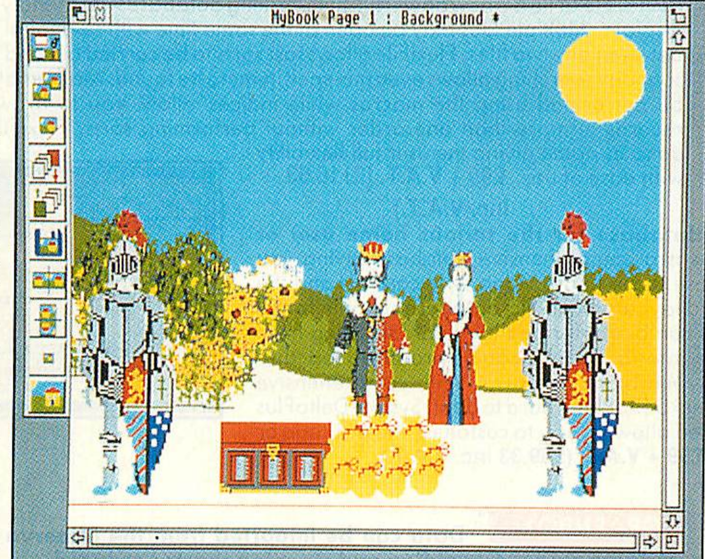
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Resource Tel: (0302) 340331
£49.95

Do you remember that classic little BBC B program, *Fairy Tales* from Resource? It was the one that spawned all those other related 'tales' like *Old Macdonald's Farm* and later BBCsoft's *Ramayana Tales*? With the advent of the Archimedes series they evolved into *Desktop Tales* and now the idea has reached the pinnacle of its evolution with *Bookmaker*.

The program represents a first step for children who want to add pictures and text to create a computer-book which can be printed in a final form or which, on-screen, can be in a process of constant growth.

At the time of writing only a pre-release, demonstration copy of *Bookmaker* was available to whet the appetite. Sadly, some functions were not implemented on this version, including printing, saving, a notepad feature, and the ability to move text or graphics to the front. However, the program was robust enough at this stage to show great promise.



Bookmaker lets children create and illustrate their own stories

Well-designed software needs very little in the way of documentation, often just a few notes to get you started and *Bookmaker* passes this test very well. The program is loaded onto the icon bar from where a new book can be begun or from where the program can be configured to reveal only those features. the teacher/adult sees as being suitable for the children's level of ability. Being totally Risc OS compliant, opening a book is as simple as opening a new drawing screen in *Draw*.

The page-creating window has a master toolbar attached. There are three areas of operation: the backdrop, the foreground and text each with its own series of related functions. Pictures from a picture library can be dragged into the main window and dropped onto the backdrop. A backdrop always appears in the background and this can be modified if required or a new one can be created using any Arc painting package. Adding text is as simple as clicking in the window where you want the text to appear, thereby automatically opening a text window.

Text can be typed in directly or an *Edit* file can be dragged into the text window. Text can be modified in the usual Risc OS manner. Both text and pictures can be moved or resized and pictures can additionally be halved or doubled in size.

If the price is right then *Bookmaker* looks certain to be popular. Its ease of use, flexibility and configurability make it a very versatile and adaptable piece of software particularly relevant to Key Stages 1 and 2. Resource says that the release version will accept *Draw* files and a talking *Bookmaker* module has been promised later this year.

Resource has now also announced the inclusion of *Bookworm*, a versatile book reading program, with the package.

Chris Drage

IMPRESSIONIST PAINTING

You don't need a specialist package to make slides. Graham Bell explains how to do it with Impression

Using 35mm slides is a common way of making a business presentation. On a PC or a Mac, you can best do this by using a 'slide recorder' – costing several thousand pounds – to produce a slide copy of the screen. On the Archimedes, this isn't possible, as no-one sells the appropriate software or hardware. But there is a way: prepare your slides as Postscript files then send them to a bureau. For about a fiver each, you can get back perfect transparencies. Slides are quite different from newspaper or magazine pages, but you can use *Impression* – or any other DTP-style application – to design your slides.

Before you start, it's vital that you check out what size to make the slides. Measuring a 35mm slide isn't right, so ask the bureau. Some will say '11x7¹/₃ inches', others will say 'A4-sized but in three by two proportions' or something similar. Also, get a list of which Postscript fonts are already installed on the slidemaker – check they have at least the standard 35 Laserwriter set. Once you know this, step one is to prepare a suitable printer driver.

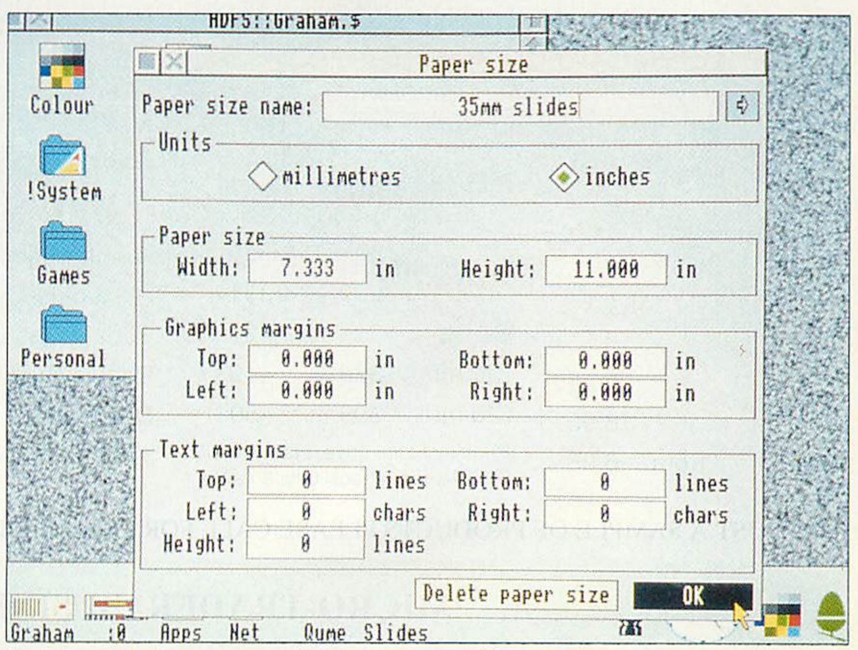
To set up the printer driver, we need to first define a suitable paper size. Load up the *Printers* application and choose the Edit paper sizes dialogue. This allows you to type in a new name for the paper size – I used '35mm slide' – and the new dimensions, in this case 7.333 wide and 11 inches high, then click on OK. Most slide machines work this way, even though most presentation slides are landscape.

Next, open the Printer control dialogue from the icon bar menu, and from the Printers folder drag in the Generic Postscript printer file. Select the new printer in the Printer control window, and from the menu choose Configure. This dialogue allows you to change the name of the printer that appears on the icon bar – I used 'Slides' – and the paper size to be used. You can pick your new 35mm slide size from the pop-up menu. Finally here, don't forget to check the Colour box! Click OK.

You should now have a new printer icon on the icon bar. With Risc OS 3, you can have several, and switch between them: mine's set up with a Qume A4 printer and a slidemaker. The final touch is to set up the slidemaker so it produces a file, rather than trying to print anything. Press SHIFT-Adjust over its icon to pop up the Connections dialogue, choose File output and insert a suitable file name. You can drag a file icon to a directory display to set up the name if you wish. Click OK, then Save choices from the icon bar menu.

Step two is to create your slides using a DTP application. You need to work in colour, and it's usual to use a dark background. Using *Impression*, I made up a master page with the right 7.333 by 11 inch size arranged landscape. On this master page, I put the relevant running footer and company logo plus a range of guide frames. But forget the coloured background for the moment, and keep the text black. Once you've got the master right, designing slides is as simple as doing ordinary pages, and you can proof them on your normal printer.

When you are happy with your slides, step three is to add the special touches to turn your pages into slides. First use Edit style to change



Producing slides is as easy as producing paper pages with Impression

the Font foreground colour of Basestyle to white. Don't worry if your text disappears.

On the first slide add a repeating frame to cover the whole page, and put a nice graduated fill into it. *Draw*'s Grade function does this well, and if you make sure there are at least 128 steps in the grade, then you won't get any banding effects in the final slide. It's better to go to 256 steps in the grade, but test this first as some slidemaking machines can't handle this many colours. Once you've dragged in the drawing, use Alter frame to unlock the aspect ratio and make the drawing fill the frame. Bump up the scale a bit if you can see a white edge, then click on OK. Now put the frame to the back.

Lastly, you have to go through the slides, using Alter frame to change every frame background to transparent. Editing text is much slower with transparent frames; it's faster to change the frames after the rest is finalised.

Load up your new *Slides* printer driver, and print your document. Remember to check Sideways if your slides are landscape. The printer driver will create a Postscript file on disc, which you can transfer to a DOS 720K or 1.4Mb floppy disc. If you've used any fonts that aren't in the standard set of 35, then the printer driver will automatically include these. Send this disc, with a paper proof, to your local slide bureau. Remember to tell them what sort of file it is, and on what sort of disc.

SLIDE STYLE TIPS

- Keep everything simple, with as few words as possible on each slide
- Stick to only a couple of type sizes and fonts, and make the type at least 24pt (at A4 equivalent size) so it's readable when projected
- Graphs are better than tables of figures, but over-fancy 3D perspective ribbon graphs with graduated tint backgrounds only obscure your message. Use simple graphs and charts
- Blue and dark red backgrounds are better than green or yellow
- Keep everything half an inch or so from the edge of the slide, as some projectors don't quite show all the slide area

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A3010



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† price includes Acorn colour monitor - Acorn multiscan monitors optional

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ARM 3	175.00
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'Micro-Trader' consists of a powerful range of computer programs to meet the many needs of the small to medium sized business.
'Micro-Trader' provides professional integrated accounts that have been designed by a businessman to meet the needs of the businessman.

"The forms are masterpieces of good layout and the handbook is comprehensive and well written" - MU May'92

"The Micro Trader System is so flexible and easy to use ... who says accounts can't be fun? .. I have really enjoyed using the system on the Archimedes" - a Yorkshire commercial user

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"The system manual is excellent ... it is both comprehensive and easy to follow" - Acorn User June'92

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"... working well. My accountant was very pleased with the display on the monitor and the figures on the reports" - a Devon user

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Archimedes micro

System	Basic	Colour	Multiscan
A3010-1Mb Family	£424	£584	£749
A3010-2Mb L/C	–	£680	–
A3020-2Mb FD	–	£749	£799
A3020-2Mb HD60	–	£899	£949
A4000-2Mb HD80	–	£949	£999
A4000-Home Office	–	£999	£1049
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Pocket Book	£212	–	–
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Archi A4 Notebooks

A4 Notebook with 2Mb RAM	£1399
A4 Notebook 4M RAM/60M HD	£1699

FREE OFFER

When you purchase any of the above Archimedes Micros, we will give 10% of the value of the machine in Hardware or Software of your choice

Archi Accessories

- 3.5" 800K 2nd Floppy Drive (305/310) £118
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- Ethernet Card £149
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- SCSI Card 16 bit £149
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- Software Upgrade Kit for the rest £40
- Hardware Upgrade Kit 300/440 £25

A3000 Accessories

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- A3000 User/Analogue/IIC I/O Card £42
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Graphics Accelerator Cards

The ultimate G8 range of Graphics Accelerator Cards from State Machine, for the Archimedes micro give more resolution, colours and speed.

Features:

- Fully programmable 24 bit colour palette allows a choice of 16.7 million colours. True 256 grey scale, primary and VGA palettes supplied for enhanced dithering with RISC OS applications.
- DTP now easier with fully legible one or two A4 page screen display in 2, 4, 16 or 256 colours.
- At least 25 frames per second local VRAM update allows applications to run without flicker or tearing of the graphics.
- Provides 50 frames per second update mode 12, 15, 20, 21, etc., on 30KHz+ line rate monitors.
- Extends the high resolution mode 23 from 2 colours to 16 at the same resolution allowing A3000 and A5000 computers to use high resolution in up to 16 colours.
- 4 layer single width podule – no soldering required
- Full documentation and operating software supplied.
- Requires RISC OS 3.10.

P.S. Not compatible with A3010, A3020, A4000 and A4.

G8 Pro additional features:

- Desktop compatible 768 x 576 CCIR PAL interlace in 256 colours
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G8 Plus	£245
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Supplied with 3.5" Floppy Disc Drive and a mouse, upgraded to 2Mb RAM, Colour Monitor and lead, TV modulator, 20Mb fast IDE Hard Disk Drive, 'Compression' utility to increase the Hard Drive capacity to typically 40Mb, the highly acclaimed Computer Concept's Impression Junior DTP package, EasiWord wordprocessor, Quest for Gold game, applications suite of software packages and comprehensive audio training tape.

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All our memory upgrades are simple to fit. No soldering required. Fitting instructions supplied.

- **R300**-4 Layer RAM upgrade board (Bare). £25
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Acorn's Archi DTP Package	£69
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Hi-Speed, Low Cost Archi Hard Disc Drive

Watford's advanced interface allows IDE drives to work on any Archimedes machine, speeds in excess of SCSI devices can be obtained at a fraction of the cost of a SCSI drive.

Up to four drives are supported by the IDE filing system IDEFS, up to two drives can be attached to each expansion card, up to four cards can be installed in a machine. An optional 20Mb or 40Mb hard disc can be supplied on the podule expansion card itself, with its fast transfer rate and power saving modes the drive is ideal for storing commonly used software such as the !Fonts application.

A powerful security feature has been provided with the two unique commands *IDELock and *IDEUnlock, ideal for educational establishments where hacking or tempering may be prevalent that may lead to loss of data. Once locked, the configuration can not be changed until a secret password is used. The !IDEForm Write Protect option is particularly useful in conjunction with *IDELock as it will prevent any unauthorised deletion of data.

By an innovative use of on-board memory, the card will remember its configuration, even if moved to another slot or even a different machine, this also includes the unique security features.

Hardware

- Single width EuroCard
- Supports proposed ANSI ATA (IDE) specification
- Fast 16 bit MEMC interface interrupt driven to support background disc operations
- 5 Mbytes per second peak transfer rate
- Optional on-card 20Mb or 40Mb hard disc
- Up to two drives (master and slave) per card
- Multiple cards per machine (up to four)

Software

- Conforms fully to the Acorn IDE Specification
- All software supplied in ROM
- Filing system 'IDEFS'
- Desktop filer with drive ready detection and disc name under icon
- !IDEForm, WIMP based configuration and formatting software
- Drives can be individually write protected
- Up to four drives over multiple cards
- Power saving standby modes supported with configurable timeout
- Drives can be used without translation in native mode for minimum overhead
- !IDEFSDisk, creates PC emulator hard discs

Prices

Part No.	Capacity	Access Speed	Price
ADA 0520	44Mb	28mS	£195
ADA 0530	100Mb	16mS	£295
ADA 0570	200Mb	15mS	£449
ADA 0580	330Mb	15mS	£799

All the above 3.5" hard drives are supplied complete with Controller Card, cable & Software on ROM. (Internal fitting). For use with A300/A400/A500 series machines.

For A3000 users an additional external Case and PSU will be required.

AAA 0300 External Case & PSU for A3000 **£85**

Internal Hard Disc Drives for A3000

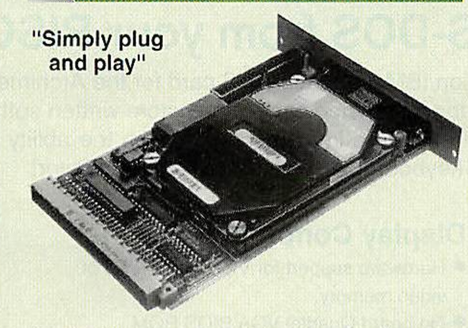
State of the art, 4 layer internal IDE Hard Cards for the A3000. Software supplied in, On-board ROM.

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ADA 0730	80Mb	18mS	£399

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Also available with 16-bit controller **£339**

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More Archimedes Products See Pages 3, 4, 5, 6, 7, 8

Archi to BBC Serial Link Mk 2

Using this simple data link, it is possible to solve all your BBC to Archimedes data transfer problems. The kit is supplied with a disk, and the necessary cable to connect the two computers.

New RISC OS Version also available (please specify)

- For A3000 £15
- For A5000 £16

For A3000 Serial Upgrade **(£19)** required

A3000 I/O Card (User, Analogue & IIC)

This NEW versatile I/O Card from Watford, fits inside the A3000 and includes an Analog to Digital Converter, a User Port, and an InterIC (IIC) connector.

The card allows many of the peripherals developed for the BBC to be used with the Archimedes A3000. The ADC and User Port have the same pin out and connectors as the BBC computers.

Extensive RISC OS software is supplied to provide BBC OSBYTE calls for support of the ADC and User Ports, including the BASIC keyword ADVAL. The software provides extended RISC OS support for separate interrupts from both the ADC and User Ports, permitting easy interrupt driven operation.

The card is provided with all the software in ROM and is automatically loaded when the machine is turned on.

Peripherals connected to the ports can obtain up to 500mA of power at +5V. A fuse is fitted to the card to protect the A3000 from damage arising from accidental short circuit of the power output.

Features

- An 8 bit User Port with a standard 20 way IDC connector, compatible with the User Port on the BBC computers and the Archimedes I/O Podule.
- A 10 bit Analog to Digital Converter with a standard 15 way D type connector, compatible with the ADC on the BBC range of computers and the Archimedes I/O podule.
- An InterIC (IIC) Port with a 5 pin DIN socket to connect the A3000 to external IIC devices.

£42

Minerva's Archimedes Software

EasyWord	£18	Time Tabler	£549
Home Accounts	£35	System Delta	£59
System Delta Program Reference Manual			£29

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£79 per module

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ARM 3 Turbo Card MkII

Simply The Best



Here it is at last – the all new Mark 2 version of Watford's highly acclaimed ARM 3 processor board for the Archimedes and now also the A3000 series computers. Using the latest surface mount technology on a high quality four layer circuit board we have reduced the overall size to a mere 53mm x 45mm, and the cost to only £169. Mk II upgrade will increase the speed of your micro by a factor of 3 to 6.

Any competent A300 or A400/1 series micro owner can fit the upgrade himself, as we provide full fitting instructions and a special ARM chip extraction tool. However for A3000 micros and those not wishing to perform the upgrade themselves, we will collect, upgrade and return your micro by courier service, at an additional cost of £18.

(A300 and old A440 series owners please note – you will need to upgrade to MEMC1A for ARM3 to work.)

RRP £249

Christmas Offer £145

Acorn have satisfactorily evaluated Watford's ARM 3 upgrade and the A3000 upgrades are fitted by Acorn approved surface mount technology centre, therefore its fitment will not invalidate Acorn's warranty on the micro.

BBC MASTER

MASTER 128K Micro incl. Acorn's View, Viewsheet, ADFS, BASIC Editor & TERMINAL plus FREE OFFER (see below) **£375**

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A 5.25" Double Sided, 40/80 track switchable 400K Disc Drive complete with cables and a Utilities disc incl. 2 games, plus

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Continued→ → → → → → → → → →

Watford Electronics Aries PC Card

Access the world of MS-DOS from your RISC OS based computer

Watford Electronics brings you a full specification IBM compatible PC card for the Archimedes. You no longer require the Archimedes PC Emulator, all PC software is run locally on the expansion card with custom written software to interface the PC card into the RISC OS environment. The expansion card is a full hardware implementation, with the ability to be turned into an ISA Bus, fully fledged 386 PC just by the addition of a power supply, keyboard, storage device and a monitor!

Processor

386SXL 33MHz low power processor. Socket for optional 387SX 33MHz numeric co-processor.

On Board Peripherals

- Uses 82C107 single chip solution.
- 128 bytes of battery backed CMOS RAM.
- AT compatible Keyboard Controller.
- Uses standard Archimedes keyboard and mouse. Full standard ISA 16 bit expansion bus available.
- Optional expander allows one or two half size PC cards to be installed in the adjacent Archimedes expansion slots.

Memory

- Uses 82C311 memory controller 2Mb zero wait state DRAM as standard, upgradable to 4Mb DRAM just by adding 4 more chips.
- Bank interleaving and page mode memory operation for maximum performance.
- On-board BIOS ROM.

Display Controller

- Hardware support for VGA with 512Kb of video memory.
- On board Quadtel VGA BIOS ROM.
- Multitasking screen display on RISC OS.
- Desktop can be achieved in software.
- Separate VGA monitor can be connected for simultaneous RISC OS and PC display or your Archimedes VGA compatible monitor can be used with optional video switch.
- Much faster and improved video speed compared to PC Emulator.

Hard & Floppy Disc

- Full background disk access, the Archimedes is not adversely affected.
- Any existing Acorn PC Emulator hard disk partition can be used, with the ability to create new PC hard disk partitions on any RISC OS hard disk.
- Optional IDE hard disk and floppy drive option for direct connection of a dedicated hard disk and floppy to PC card.
- Access to the Archimedes floppy disc drive for reading and writing of PC disc formats from PC.

Bundled Software

- MS DOS 5.0, Lotus Works and PC Organiser

Sound

- Uses the Archimedes internal speaker by connecting to the Auxiliary sound connector.

Enhancements

Optional expansion card will be available either hardware parallel and serial ports or the ability to connect an external AT style keyboard and mouse.

The PC card can also be plugged into a stand alone backplane to form the heart of a fully expandable, industry compatible 386SX computer, with no reliance upon the Archimedes.

Specifications may be subject to change. E&OE.

Call, fax or write now for more details!

Scan256 – The only sensible scanner purchase

Scan256 – the innovative 256 grey-level hand scanner for the Archimedes range of micro computers. It offers up to 256 grey levels at a maximum of 400 dpi, and comes complete with the most advanced and sophisticated 256 grey scale scanner software currently available for the Archimedes.

- Multiple copies of the image in memory at once.
- Allows multiple consecutive operations without having to save the original image to disk.
- Instant re-draw of all 4 image buffers.
- No re-calculations needed unlike other packages that use on the fly screen-dithering.
- Highly advanced dithering and image size reduction.
- Available via industry standard Change FSI package for maximum image quality. An invaluable aid to reduce the size of the image whilst maintaining maximum image quality.
- Advanced in-built image processing options.
- Convolution digital filtering fully implemented with over 100 filters covering edge detection, image enhancement and image smoothing. Enables high quality images to be obtained from poor quality scans.
- A unique L.E.D. indicator on the scanner.
- Shows you when the scanner is being moved at close to the maximum scanning speed, not just when it is too late and a scan line has been missed by moving the scanner too fast.
- Fully adjustable scale and size of image preview when scanning
- Hand held scanner image preview window can even be behind other windows and preview is shown in real-time with maximum number of grey-scales available.
- Support for The Serial Port Graphics Enhancer.
- Forthcoming support for the State Machine G8 Graphics Card.
- Allows up to 256 simultaneous grey scales on screen at once.
- True brightness, contrast and gamma correction.
- All can be specified by a value to exactly match monitor/printer. No guessing with shapes of curves and correction is mathematically correct.
- RISC OS 3 features.
- Include rotation and shearing. Scans normally are scanned at a slant rather than being rotated, shearing enables the scan to be corrected better than rotation.
- Fast RISC OS printing.
- Multiple options such as scale to page, centre, sideways selected area, and any scale.
- Scanner scans at an amazing 3ms per line.
- A post card at 400dpi takes only 7.3 seconds to scan, creating over 3Mb of data.
- Selectable scanning modes.
- 256 grey-scale, 256 grey-scale half width, 16 grey-scale and monochrome scanning modes. Half width mode enables longer 256 grey-scale scans to be achieved.
- Save image foreign formats.
- Save as industry standard TIFF for exporting to other systems, AIM for further processing, or RISC OS Sprite format.
- Single width, high quality podule using surface mount technology

The only sensible scanning and image processing solution for the Acorn Archimedes. Just compare the features, there can only be one choice...

Scan256 Scanner, Interface Card, Software and Manual Only £185

Please specify Archimedes type.
Not compatible with A3010, A3020, A4000

Call now for details about our new Scan256 Flatbed Professional Scanner

BBC Education Software

A vous la France	French programs for beginners	£29
Au restaurant/Accident de route	French games for 12 years +	£26
Bolougne and oh les	French program for beginners	£26
Computer control	Program simulating computer control	£26
Computers at work	Primary education program	£17
Espana Viva	Spanish educational programs	£20
Folks Tales	Listening and reading for ages 7+	£22
Geordie Racer	Look and read for ages 7+	£22
Hall of Mirrors	Practice word & number skills	£22
Help your child learn basic mapwork 2		£18
Inside Science	Four common science subjects	£22
Letters and pictures	Educational programs for 6-8 years	£15
Make a wildlife garden	Explore wildlife/weather/garden growth	£22
Maths with a story 1	Primary level maths programs	£20
Maths with a story 2	4 further maths programs	£20
Note invaders	Learn sheet music for 7-Adults	£15
Numbers & Pictures	Early number learning (4-6 years)	£15
Picture craft	Geometrical design & Colouring	£17
Puncman 1 & 2	Learning Punctuation (7-13 years)	£15
Puncman 3 & 4	Learning Punctuation (8-14 years)	£15
Puncman 5, 6 & 7	Learning Punctuation (8-15 years)	£15
Ramayana Tales	Simple Desktop Publisher using pictures & characters from the Ramayana	£22
Skyhunter	Look and read educational adventure	£22
Technology and design	Problem solving programs	£22
Through the dragons eye	Adventure game and Map reading	£22
Fun School 3 (Under 5)	Varied range of Education subjects	£17
Fun School 3 (5-7)	Varied range of Education subjects	£17
Fun School 3 (Over 7)	Varied range of Education subjects	£17

Archi Educational Software

- Animated Alphabet (3-6 yrs) £21
- Arcventure (8-12 yrs) £29
- Bookbinder £43
- Bumper Disc £14
- Bumper Disc 2 £14
- Craftshop 1 £26
- Craftshop 2 £26
- Converta-Key £16
- Data Word £16
- Desktop Stories £35
- DigiSim £35
- Dream Time (5-7 yrs) £23
- Farm (5-7 yrs) £19
- Fleet Street Phantom (9-13 yrs) £25
- Fun School 3 Red (up to 6 years) £17
- Fun School 3 Green (6-8 years) £17
- Fun School 3 Blue (8 years +) £17
- Gate Array Teaching System £68
- Glimpse Clip Art Utility (7-16 yrs) £8
- Highlighter (6-16 yrs) £42
- Jigsaw £28
- Mapventure (9-13 yrs) £24
- Microbugs £24
- Money Matters £16
- Nature Park Adventure (7-9 yrs) £27
- Numerator £60
- Picture Book £16
- Recall (6-13 yrs) £39
- Sellardore Tales £24
- Snippet £26
- Space Mission Mada (9-13 yrs) –
- Sting of the Dump (9-13 yrs) £22
- Target Maths £16
- Viewpoints (9-12 yrs) £33
- Wizard's Revenge (7-10 yrs) £17
- Worst Witch (7-10 yrs) £25

Archimedes Software

GRAPHICS

3D Construction Kit	£39
Arc Light	£46
ARCtist	£19
ARCticulate	£19
Art Works	£139
Atelier	£65
Artisan II	£45
Artisan Gallery	£16
Autosketch II	£65
CADet (CAD)	£140
Craftshop 1 & 2	£28
Euclid 2	£50
Graph Box	£59
Graphbox Professional	£107
HotLink Presenter	£40
Illusionist	£69
Kermit	£46
Mogul	£17
Poster	£79
Pro Artisan	£70
Prime Art	£69
Render Bender 2	£79
Revelation 2	£80
Snippet	£21
Titler	£119
Tween	£29

GAMES

Air Supremacy	£17
Apocalypse	£14
Arcade Soccer	£14
Boogie Buggy	£14
Break 147 + Supa Pool	£19
Bughunter in Space	£19
Cataclysm	£19
Chess 3D	£16
Chocks Away Compendium	£32
Chocks Away Extra	£14
Conqueror	£15
Corruption	£18
Cyber Chess	£38
Elite	£33
Enter the Realm	£19
E-Type Compendium	£20
E-Type Designer	£13
Family Favourites	£13
Galactic Dan	£19
Grievous Bodily Arm	£19
Holed Out Designer	£13
Holed Out Golf Comp	£20
Hostages	£14
Inter Dictor 2	£26
Iron Lord	£15
Jigsaw	£27
Lemmings	£20
Oh no more Lemmings	£15
Lost Temple	POA
Lotus Turbo Challenge	£19
Mad Prof Mariarti	£17
Masterbreak	£16
Man at Arms	£14
MahJong Patience	£15
Manchester United II	£19
Mig 29	£24
Nebullus	£21
Nevryon	£14
Nevryon II	£20
Olympics	£14
Omar Sharif's Bridge	£23
Pandoras Box	£18
Pipe Mania	£17
Populous	£23
Power Band	£14
Puncman 1 & 2	£16
Puncman 3 & 4	£16
Pysanki	£14
Quazer	£10
Real McCoy	£22
Real McCoy 2	£23
Real McCoy 3	£22
Redshift	£14
Return to Doom	£16
Repton 3	£14
Saloon Cars Deluxe	£27
Spitfire Fury	£22
Splice	£25
Sporting Triangles	£24
Superior Golf	£14
Superpool + Break 147	£22
Swiv	£19
Talisman	£12
Timewatch	£24
Trivial Pursuit	£22
Twin World	£15
U.I.M.	£23
White Magic 2	£15
Wimp Game	£13
Worldscape	£16
XFire	£19
Zelanites	£23

Miscellaneous

Ancestry	£59
Arccomm 2	£38
Arcterm 7	£64
Armadeus Sound	£60
Avante Garde Fonts	£23
BBC DFS Reader	£6
Broadcaster Loader	£65
Compression (CC)	£38
Equasor	£38
FlexiFile	£97
Genesis Plus	£68
Genesis 2	£99
Investigator 2	£22
Magpie 2	£42
Notate	£42
Numerator	£66
Pin Point	£65
Presenter 2	£29
Presenter Story	£145
Prophet	£132
Prophet Demo Disc	£10
Rainforest	£17
Revelation 2	£95
Rhapsody in Blue 2	£45
Score Draw	£46
Show Page	£127
Speech!	£15
The Victorian	£17
Time Tabler	£549
Toolkit (Clares)	£35
Touchtype	£40
Tracker	£39
Turbo Driver BJ10E	£42
Vox Box	£46
WorldScape	£17

LANGUAGES (Archimedes)

ISO-PASCAL; FORTRAN 77 — £77 each
Assembler; LISP; Prolog X — £149 each

Desktop C	£199
Macro Assembler	£40
Robo Logo	£69
BASIC Compiler	£77
Logotron Logo	£45
Risc Basic	£120
Risc FORTH	£110
Cambridge Pascal	£95

Archimedes External Disc Drive Interface

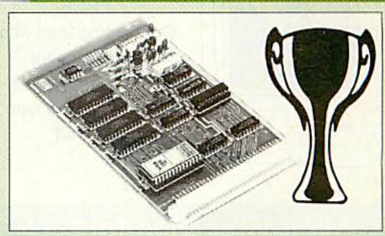
With this interface it is possible to connect almost any 5.25"/3.5" disc drive with its own power supply to the Archimedes. Upto 4 disc drives can be connected. Fully Buffered Board. NO SOLDERING is involved. Supplied complete with necessary lead.

Price £21

Back Plate Extension

- A300/400 £15;
- A3000 £14

Archi Real-Time Digitiser



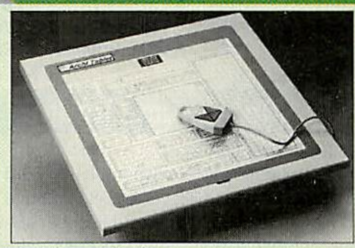
Now supplied with NEW RISC OS Version Software

Watfords' Archimedes Video Digitiser is the most sophisticated digitiser ever designed for a micro. It provides a fast and flexible means of capturing images from a video camera or recorder for display and manipulation on the Archimedes range of Micros. Off-air televison signals may also be digitised via a video recorder or TV tuner. Please write for further details.

Price £119

A Set of Colour Filters for colour image grabbing using a video camera £16

Archi Graphic Tablet



The Archi Graphic Tablet offers performance and accuracy comparable to other tablets priced at well over £400, and has the useful addition of a liftable cover, which can hold tracing material or menu templates securely. The package is supplied complete with sophisticated Archi software. (Now, fully LinCAD compatible. Recommended by Linear Graphic for use in Education).

(FREE this month, PC Mouse Drivers & Art package)

Special Price £199

(Price includes Tablet, Leads, Software & Puck)
Stylus Optional Extra **£20**

Archi Graphic Tablet Junior. Working area 9" x 6". Price includes Stylus **£125**

Concept Keyboards

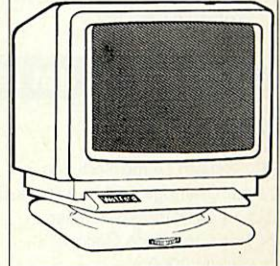
- A4 Standard Pack £95
- A4 Primary Pack £100
- A4 Designer Pack £110
- A3 Standard Pack £99
- A3 Primary Pack £105
- A3 Designer Pack £110

- Universal 2010 Keyboard A3 £115
- Universal 2010 Keyboard A4 £110

Cortian CKAI Interface

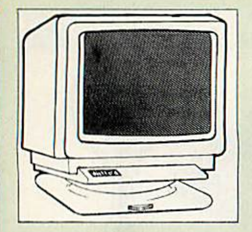
Eliminates the need to have a User port in A3000, A5000 and any other Archimedes without User Port. Fits to the Econet socket. £29

STAR BUY MONITOR



This attractively finished, etched screen medium res monitor is supplied complete with built-in speaker, volume control and video input. All controls are located on the front panel for ease of use. Ideal for BBC, Archimedes and Amiga.

Only £149



FREE
Connecting lead with every monitor purchased from us. Please specify type required.

Microvitec Monitors

- **1431** – Standard Resolution Monitor #£169
- **1451** – Medium Resolution Monitor #£209
- **Cub3000** Medium Res for A3000 #£189
- Dust Cover for Microvitecs £5.50
- **Touchtec 501 Touch Screen** £239

Includes 3 years parts & labour warranty

Multiscan Colour

Eizo 9060S	£389	NEC 6FG	£1485
Eizo F550i	£726	Taxan 787	£210
Eizo T560iT	£1319	Taxan 787LR	£230
Eizo T660i-T 20"	£1615	Taxan 795	£394
NEC 3FG	£345	Taxan 875	£670
NEC 4FG	£442	Taxan 875+	£705
NEC 5FG	£827	VIDC Enhancer	£25

Aries AlphaScan Monitor

Its multiscan circuitry provides automatic adjustment for frequencies between 30 and 60KHz horizontal, and 50 and 90Hz vertical. Its 0.28mm dot pitch high resolution tube provides super sharp text graphics, while a high speed (70/72Hz) refresh rate provides a flicker-free display easing the eye strain. The Multivideo VIDC Adaptor supplied with the monitor allows high resolution operation in all screen modes. **£325**

- Aries Alphascan 17" Plus £545

Philips Monitors

- **BM7502** 12" Hi-res Green Monitor £74
- **CM8833** 14" Med. Res Colour Monitor £179
- Dust Cover for Philips Monitors £6
- Spare Monitor Leads (various) £7

VIDC Enhancer

This unique VIDC add-on board for the Archimedes, caters for all types of Multiscan and VGA monitor and mode requirements. There are 2 versions to suit all requirements. The multimode software supplied, provides all the new modes for the selected monitor type, including the now standard Computer Concepts modes. With VGA monitor, you are no longer restricted to a few modes. A Desk Top application supplied on disc, allows new modes to be designed and existing modes to be modified for particular monitors.

Super VGA VIDC Card: Its unique design allows the horizontal and vertical sync to be buffered and have the polarity changed under software control **£45**

MultiVideo VIDC Card: As above but for MultiScan monitors only. **£25**

Integrex Ink Jet Printers

- Colour Jet 132 Printer £425
- Paper Roll £6.50
- BBC Screen Dump Software £10
- Colour Cartridge £21 • Black Cartridge £12.40
- 100 A4 OHP transparencies £55
- 8K Serial Interface Optional £123
- Colour Jet 2000 £529
- Betajet Ink Jet Printer £185
- Betajet Cut Sheet Feeder £43
- Integrex Colourjet Series 2 £POA

Star Printers

LC15	£168	LC200 Colour	£140
LC20	£99	SJ48 Inkjet	£165
LC100 Colour	£136	XB24-200 Colour	*£288
LC24-15	£233	XB24-250 Colour	*£350
LC24-20	£148	XB24 Colour kit	£29
LC24-100 Colour	£162	ZA200 Colour	*£230
LC24-200	£162	ZA250	*£295
LC24-200 Colour	£205		

- Star/Archimedes Colour Printer Driver £15

* Includes 12 months On-site warranty

Cut Sheet Feeder

LC10/200/24-10	£65	LC15/LC24-15	£125
XB24-10	£80	XB24-15	£139
XB24-200	£99	XB24-250	£149

Serial Interfaces

8K Ser LC-200; LC24-200; FR10; FR15; XB24-10; XB24-15 £52

Buffers

32K Ram Card for LC/XB24-10; 15; LC200 £55

Star Printer Ribbons

LC10; LC10-II; LC15	Black £4;	Colour £6
LC-200; LC24-200	Black £5;	Colour £12
XB24-10; XB24-15	Black £5;	Colour £12

- Dust Covers for Star Printers £6

NEC Pinwriter Printers

P20#	£169	P70	£396
P30	£235	P90	£603
P60	£322		

- P60/70 Colour Option Kit £59
- Ribbons Black for P20/30 £6 for P60/70/90 £7
- Ribbons for P60/70/90 Black £9 Colour £13.50

Includes 12 months on-site warranty

Cut Sheet Feeders

P20 £59; P30 £85; P60 £89; P70/90 £80

Panasonic Printers

KX-P1123	£126	KX-P2123M	£165
KX-P1124i	£169	KX-P2123C	£195
KX-P1170	£98	KX-P2180M	£146
KX-P1624	£250	KX-P2180C	£152
KX-P1654	*£330	Colour Kit for KX P2123M/2180M	£38
KX-P1695	£267		
KX-P2624	*£268		

*** Price includes 12 months On-site warranty**

Cut Sheet Feeders

P36 – 1124/24i £79 **P37** – 1123/70/80 £69
P38 – P1624/95; P2624 £129

Buffers

P12 4K Buffer Board for KX-P1081 £55
P14 32K Buffer P1123/24/70/80 P1540/92/95; P1624/54/95 £16

Serial Interfaces

P13 for all above printers £49

Original Panasonic Ribbons

Guaranteed to last 3 million characters

P110 for KX-P1081, 1592 & 1595 £6
P115 for KX-P1180 £7 **P145** for KX-P1124 £7
P140 for KX-P1540 £8 **P155** for KX-P1624 £8
Colour Ribbons for KX-P1081, 1592 & 1595 Brown, Blue or Red **£9 each**
P150C Colour for P2123/2180 £15

Citizen Printers

120D Plus	£95	Swift 9	£145
224	£174	Swift 24X	£299
240 Colour	£212	24X Colour Opt	£32
PN-48	£199	PN48 Ribbon	£4

- AH29804 Manual Cut Sheet Feeder for Swift 9/24/124. Holds 50 Sheets £29

+ FREE 2 years Parts and Labour warranty on all Citizen Printers

- Swift 9 Colour Option £19
- Swift 24 Colour Option £29
- Swift 24 Ribbons Black £4 Colour £13
- Swift 24X Ribbons Black £8 Colour £16
- Citizen/Archimedes Colour Printer Driver £15

Laser Printers

All Laser Printers include 12 months On-site maintenance

Brother HL4-VE	4ppm	£549
Brother HL4-V	4ppm	£639
Brother HL4-PS Postscript	4ppm	£970
Brother HL8-V	8ppm	£894
Brother HL-10V	10ppm	£1059
Brother HL10PS	10ppm	£1329
Brother HL10DV	10ppm	£1149
Brother HL10DPS	10ppm	£1449
Canon LBP4 LITE	4ppm	£479
Canon LBP4+ 1.5M RAM	4ppm	£632
Canon LBP-8III Plus	8ppm	£945
Canon LBP-8 plus IIIR	8ppm	£1435
Epson EPL4300	4ppm	£566
Epson EPL4000	6ppm	£475
Epson EPL7500	6ppm	£1139
Epson EPL8100	10ppm	£920
Fujitsu VM800 (Best Buy)	8ppm	£685
HP Laserjet IIP+	4ppm	£530
HP Laserjet IIID	8ppm	£1487
HP Laserjet IIIP	4ppm	£595
HP Laserjet IIIsi	16ppm	£2419
HP Laserjet IV (600 dpi)	8ppm	£989
HP Laserjet 4M PS	8ppm	£1369
NEC Silentwriter S62P P/script	6ppm	£1019
NEC Silentwriter 266	8ppm	£669
NEC Silentwriter 290P P/script	8ppm	£1369
NEC Silentwriter S102	8ppm	£989
OKI OL400	4ppm	£440
Panasonic KX-P4410	5ppm*	£515
Panasonic KX-P4420	8ppm*	£615
Panasonic KX-P4430 Satin Print*	5ppm*	£586
Panasonic KX-P4451	11ppm*	£1028
Panasonic KX-4455 Postscript	11ppm*	£1349
Star LP-8 III 2	8ppm	£1249
Star LP-8 III	8ppm	£890
Star LP-8 Star(post)script	8ppm	£1130
Star LP-4	4ppm	£565
Star LP-4 Mk 3	4ppm	£589
Star LP-4PS Postscript	4ppm	£769

* Now with 2 years On-site warranty

Laser Toners

Canon 2, 3 & 4	£46	Star LP4/LP8	£56
Epson GQ	£13	KX-P4420/30	£24
EPL 4100	£69	Laserjet HP IIP & IIIP	£42
EPL7100/7500/ 8100	£125	Laserjet II/D, III/D	£48
HP 4	£75	Qume Crystal (3)	£58

Laser RAM Upgrades

IIP; III/P 1Mb	£49	Canon LBP8 2M	£125
IIP; III/P 2Mb	£80	EPL7100 256K	£39
IIP; III/P 4Mb	£132	GQ5000 512K	£42
II & IID 1Mb	£60	KX4420/50 1M	£75
II & IID 2Mb	£96	KX4420/50 2M	£115
II & IID 4Mb	£142	KX4420/50 4M	£195
HP4 1Mb	£65	Star LP8 1M	£139
Canon LBP4 1M	£105	Star LP8 2M	£275

Laser Drum & Developer

Epson Drum GQ5000	£93	EPL7100	£129
Panasonic 4420 Drum	£60	Developer	£59
Panasonic 4450 Drum	£93	Developer	£80
Qume Drum	£76	Developer	£56

Jetpage Postscript Cartridge

- HP IIP/III £225 IID & IIID £227

Various Add-Ons

- HP Adobe Postscript £399
- HP Premier Font Collection £28
- Laserjet various Font cartridges from £45
- Canon LBP-4 Lower Cassette Tray £75
- Pacific Page Postscript £259

Laser Direct

- Special High Res Card 600 DPI for Canon LPB 4 & LPB 8 Laser Printers £315
- LPB 4 Printer plus High Res Card £945
- LPB 8III Printer plus High Res Card £1275
- LPB 4 Optional Paper Tray £79

Hewlett-Packard Printers

DeskJet 500	#£255	DJ500 colour	#£325
DJ550 colour	#£415	Paint Jet	+£495
Paint Jet XL	+£1045	PaintJet XL300	+£1775
QuietJet	+£293	QuietJet plus	+£379

+ Includes 12 months on-site warranty
Includes 3 years extended parts & labour warranty
- For additional £50, (£75 for DJ500 & 550 colour), we will convert above 3 years warranty, to 3 years on-site maintenance warranty

- DeskJet 500 Cart. Black **£14**; Colour **£23**
- Paintjet Cartridges Black **£19**; Colour **£23**

Desk Jet 500 Accessories
- 256K RAM Cartridge £69
- HP Epson FX Emulation Cartridge £59
- High Capacity Black Ink Cartridge £21
- 50 x A4 Transparencies £32
- DJ500 Colour Archimedes Printer Driver £15
- Dust Cover £6
- DJ500 does not require Archimedes Driver

Plug In Font Cartridges for DJ 500
- 22706B – Prestige, Elite, Line Draw fonts £55
- 22706C Letter Gothic & HP Line Draw fonts £56
- 22707P – Proprint Emulation Cartridge £57
- Desk Jet Unlimited (Book No VAT) £19.75

Canon Bubblejet Printers

	Printer	CSF	D'ble Bin	Ink Cart
BJ10EX	£160	£43	–	£16
BJ20	£248	–	–	£16
BJ200	£275	–	–	£16
BJ300*	£335	£88	£65	£12
BJ330*	£373	£110	£79	£12
BJC800C	£1355	–	–	£16

* Includes 12 months On-site warranty
- Spare Battery pack for BJ10E £33
- BJ10EX – Archi Turbo Driver £42

Special Offer:
Canon BJ10EX Printer + CC's Turbo Driver **£210**

Epson Printers

DFX5000	£1069	LQ1070	£308
DFX8000	£1920	LQ1170	£429
FX850	£255	LQ2550+	£669
FX870	£POA	LX100	£117
FX1050	£322	LX400	£90
FX1170	£POA	LX850+	£134
LQ100	£144	LX1050	£199
LQ570	£197	SQ870	£409
LQ870	£352	SQ1170	£560
LQ1060 Colour	£588	SQ2550	£669

- Tractor Feed for LQ100 £29
- Original Ribbon for LQ100 £6

Cut Sheet Feeders for
LQ570, LQ870 **£47**
LX400/850/LQ200/400/450/500/550
LQ1010/1070/1170 **£72**
LX1050 **£115** FX850/LQ860 **£128**
FX1050/LQ1060/SQ850 **£155**
LQ2550 **£299** SQ2550 **£210**

Tractor Feed for
LQ800 **£44**; LQ850/FX850 **£69**; LQ1050/FX1050 **£85**; LQ2500 **£90**; LQ2550 **£90.**

Accessories
- EX800/1000 Colour Option **£45**
- EX800/1000 Colour Ribbon **£14**
- LQ2500 Colour Option **£65**
- Multifont Card for LQ550/850/1050 **£95**

Epson Printer Interfaces
RS232 **£28** RS232 + 2K Buffer **£52**

Printer Leads

BBC Centronics 4' long	£5
BBC Centronics 6' extra long	£7
Compact's Special Centronics Lead	£7
Nimbus Centronics Lead	£6
IBM/Archimedes Parallel Lead 6'	£5
IBM/Archimedes Parallel Lead 5 metres	£10
IBM/Archimedes Parallel Lead 10 metres	£15
Double Ended 36 way Centronics Lead 4'	£7
Double Ended 36 way Centronics Lead 6'	£9
RS232 Leads (Various)	P.O.A.

Roland Plotters

- DXY1100 **£488**
- DXY1200 **£620**
- DXY1300 **£825**
- DXY2500 **£2345**
- Sketchmate A3 **£499**
- Sketchmate A4 **£308**
- Roland plotter Pens, Fibre tip **£7.50**

Fujitsu Printers

Special Introductory Offer
- B-100 InkJet – HP Deskjet compatible 300dpi, whisper-quiet & 6 resident fonts #£175
- B-200 InkJet – HP Desk Jet compatible 300dpi. Built in Cut Sheet Feeder. Optional 2nd Bin/Tractor available #£249
- DL-1100 Dot Matrix – 24 pin, 110 column Colour optional £199
- DL-1100C Dot Matrix – 24 pin, 110 column With colour option £235
- VM-800 Laser – 8 page per minute, Laserjet 3 compatible, 350 sheet paper tray, Resolution enhancement #£685

FREE 1 Year On-site maintenance, within mainland UK

- B-100 Cut Sheet Feeder £59
- B-200 2nd Bin Sheet Feeder £89
- B-200 Tractor Unit £59
- B-100/200 Ink Cartridges £14
- DL-1100 Colour Upgrade £39
- DL-1100 Black Ribbon £5
- DL-1100 Colour Ribbon £11
- VM 800 Toner Cartridge (8000 pgs) £99

Full range of Fujitsu Printers available at very competitive prices. Please telephone for details

Listing Paper (Perforated)

- 1,000 Sheets 9.5" x 11" Fanfold Paper £7
- 2,000 Sheets 9.5" x 11" Fanfold Paper £11
- 1,000 Sheets 9.5" x 11" NCR 2 Part Fanfold £21
- 1,000 Sheets 15" x 11" Fanfold Paper £9
- 2,000 Sheets 15" x 11" Fanfold Paper £16
- 1,000 Sheets true A4 Fanfold Paper 70gms £11
- 2,000 Sheets true A4 Fanfold Paper 70gms £21
- Teleprinter Roll (Econo paper) £4
- Telex Roll 50 metre £3

(All our Fanfold paper is Micro perforated leaving a smooth clean edge when the tractor feed strips are detached).

Carriage 1K Sheets £2.50, 2K Sheets £3.00

Printer Labels

(On continuous fanfold backing sheet)

1,000 off, 90 x 36mm (Single Row)	£6.00
1,000 off, 90 x 36mm (Twin Row)	£6.25
1,000 off, 90 x 49mm (Twin Row)	£7.50
1,000 off, 102 x 36mm (Twin Row)	£6.75

Laser Printer Labels on A4 Sheets

3750 off, 70 x 29mm (3 Rows x 10)	£15.50
2400 off, 70 x 37mm (3 Rows x 8)	£15.25
2625 off, 70 x 42mm (3 Rows x 7)	£15.00

Printer Ribbons & Various Dust Covers

Type	Ribbons	Dust Covers
BBC B/BBC Master	–	£4.00
Archimedes Micro pair	–	£9.00
Citizen 120D	£3.25	£5.00
DMP2000/4000	£3.75	£4.95
EX800/1000	£3.50	£5.00
RX/FX80/85/800/MX80	£2.95	–
FX/MX/RX100/1000	£3.95	–
Kaga/Taxan KP810/815	£3.25	£5.00
LQ400/500/550/800/850	£3.25	£6.00
LQ1050/LQ2500	£12.00	–
LX80/86	£2.75	£4.50
LX400/800/850	£3.50	£5.00
M1009/GLP	£2.95	£3.75
NEC P2200	£4.50	£5.00
Panasonic KX1080/81	£6.00	£5.00
Panasonic KX-P1124	£7.00	£5.00
Star LC24-10	£2.95	£6.00

Professional Printer Stand



The professional printer stand takes hardly more space than your printer. Due to the positioning of the paper feed and re-fold compartments ie. one above the other, the desk space required for your printer functions is effectively halved. Its ergonomic design ensures smooth paper flow and automatic refolding.

80 Column version £24 (carr. £3)
132 Column version £29(carr. £4)

Universal Printer Sharers/Changer

Connect up to 5 Micros to 1 printer or 5 printers to 1 Micro with our combined, Sharer/Changer switch boxes.

Standard Low Cost Type

Connects	Serial	Parallel
• 2 to 1	£12	£13
• 3 to 1	£16	£18
• 4 to 1	£23	£24

Professional Type

Connects	Serial	Parallel
• 2 to 1	£17	£18
• 3 to 1	£22	£25
• 5 to 1	£34	£38

Cables extra at £6 each

Cross Over Manual Switch

2 In/2 Out Parallel	£29
2 In/2 Out Serial	£28
3 In/2 Out Serial	£36

Auto Printer Sharer

Connects	Serial	Parallel
2 to 1	£40	£45
4 to 1	£62	£49
8 to 1	–	£89

256k Multi Spooler

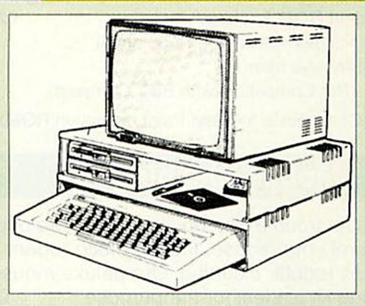
These Auto Parallel Printer Sharers have built-in 256K of Printer Buffers. They can be used as Auto Sharers, Printer Buffers or both.

- 2 In/2 out **£135**
- 4 In/2 out **£169**
- 8 In/1 out **£199**

Compact Converter Units

Serial to Parallel **£36** Parallel to Serial **£37**

Plinths for the BBC B, BBC Master & A3000

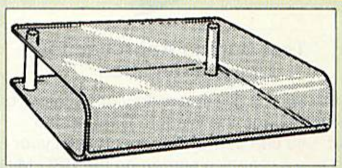


Protect your computer from the heat of your VDU. Our micro plinths have slots for maximum ventilation. The single plinth is suitable for a BBC and VDU, whilst the double height version provides enough room for our stacked disc drive and other peripherals like, Eprom programmer, music unit or simply discs & stationery. The computer slides neatly in the lower section allowing easy access to remove the lid. Colour: Matching BBC Beige.

- Single BBC Plinth 420 x 310 x 105mm **£13**
- Double BBC Plinth 420 x 310 x 210mm **£24**
- Single Master Plinth 490 x 310 x 105mm **£14**
- Double Master Plinth 490 x 310 x 210mm **£26**

- A3000 Single Plinth (very sturdy & precision made), has a slot on the left for the switch & cut out on the right for 3.5" Disc Drive **£15**

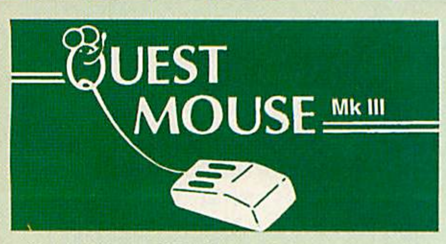
Perspex Printer Stand



Give your Computer System a touch of Class with our elegant, smoke finished Perspex Printer stand.

80 Column version **£16** (carr £3)
136 Column version **£20** (carr £4)

Continued→ → → → → → → → → →



- Quest Mouse III & Quest Paint £49
- Quest Mouse III, Quest Paint, AMX Stop Press & Pagefont £69
- Quest Mouse III only £25
- Quest Paint Software only £28
- Quest Font Disc (22 Text Fonts) £15
- Quest Mouse Mat (Red or Blue or Green please specify) £3
- Quest Colour Dump Disc – This new software allows you to print direct from Quest Paint to your Integrex Colour Printer £18
  (P.S. Quest Paint is not compatible with BBC Compact)

Quest Paint is the winner of the BBC Acorn User 1990 Award for the Best Art/Graphics software

ConQuest

Quest combined with ConQuest and Acornsoft GXR ROM make up THE MOST POWERFUL drawing packages available for the BBC range. Quest Paint is able to take advantage of almost any additions to your machine, such as Shadow or Sideways RAM. ConQuest takes this principal even further, by utilising the otherwise normally incompatible Sideways RAM facility by holding pictures in them.

ConQuest ROM Package £28
(Price includes software in ROM and a comprehensive Manual).
(Not Compatible with BBC Compact)
(P.S. Conquest is a Quest Paint extension ROM).

Mouse Cleaning Kit

To obtain trouble free operation and prolong the life of your mouse, the high tech rodent requires regular cleaning. Our deluxe mouse cleaning kit is ideal for the purpose £3

BEEB VIDEO DIGITISER



"Test Bureau Approved for Use in Education"

Using any source of composite video (colour or monochrome) and the Watford Beeb Video Digitiser, you can convert an image from your camera into a graphics screen on the BBC Micro.

Winter Sale Price £75

(BBC B, B+ and Master 128 compatible, except Master with Econet)

(Price includes: Digitiser Unit, Software in ROM & a Comprehensive Manual)

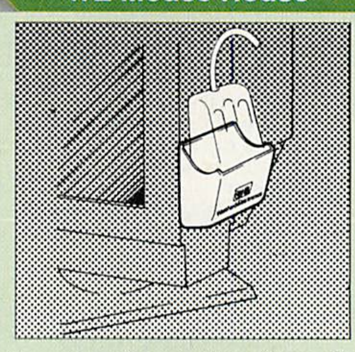
Archi Mouse Port Splitter

Our handy little splitter unit eliminates the risk of damaging your micro due to constant plugging and unplugging of the mouse by allowing you to connect both, a joystick and a mouse simultaneously to your Archimedes. £15

Mk III AMX MOUSE

- **AMX Mouse plus Super Art £49**
  (Please specify for BBC, Master or Compact)
- AMX MOUSE ONLY £25
- AMX SUPERART Package £26
- AMX STOP PRESS – A Desktop publishing software. Works with Keyboard, Joystick or a mouse £25
- PAGE-FONTS – Over 20 Fonts for use with AMX Pagemaker £13
- AMX DESIGN (ROM) £29
- AMX EXTRA EXTRA £16
- MOUSE MAT £3

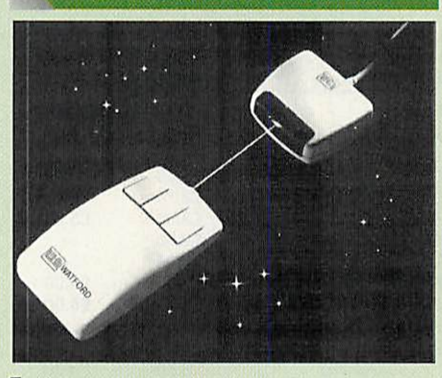
WE Mouse House



Treat your mouse to a cosy Mouse House. This handy little gadget solves the problem of where to store your mouse when it is having a rest. Made of sturdy plastic, the WE Mouse House attaches to the side of your computer, monitor, disc drive etc.

Only £3

Archi Cordless Mouse



Features
- Infra Red Signal Transmission
- High Resolution 200 DPI
- High Tracking Speed of 600mm/s up
- Anti-static Silicon Rubber Coated Ball
- Low Friction Teflon Footpads
- Power - by two AAA size batteries (not included)
- Automatic Standby Mode after 5 seconds inactive
- Auto Power Shut-Down after 20 seconds inactive

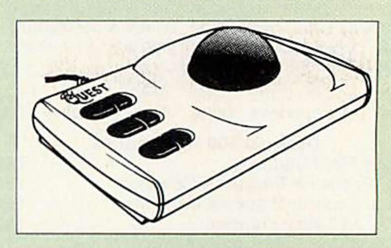
Price £39



CREDIT CARD 24 HOUR Ansaphone Hot Lines (0923) 250234 or 233383

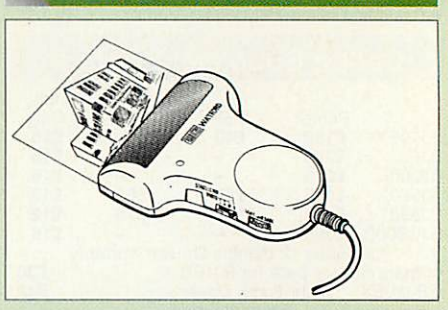
Quest – Tracer ball

An attractively finished, extremely reliable, mouse replacement, input device. Requires very little desk space. Connects directly to your BBC B, BBC Master or Archimedes Micro.



QT-10 BBC/Master Version £25
QT-20 Archimedes Version £26

Beeb Hand Scanner



Watford Beeb HandScan is a compact unit which will allow photographs, diagrams, or any other documents to be digitised quickly and easily, to then be used in a desk top publishing package, art program, or even in your own Basic programs!

The HandScan plugs directly into the 1MHz bus on the BBC while a comprehensive set of utilities provided by the sophisticated ROM firmware. The scanner has a resolution of either 100 DPI or 200 DPI when accuracy is essential. Pictures as wide as 4" may be scanned in mode 0 and various types of dithering may be selected to simulate the grey levels of a scanned picture.

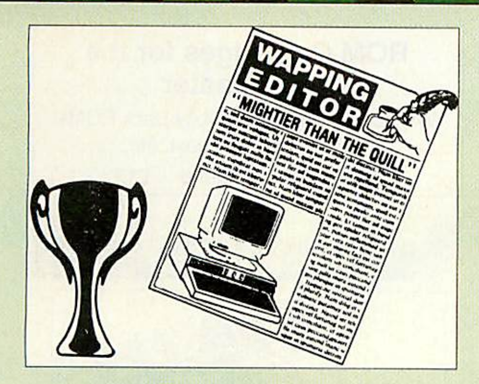
All necessary software has been included in the firmware to allow the scanner to read images directly into our Wapping Editor with little more than the click of the mouse. The digitised picture may then be incorporated into your magazine, newsletter, report or any other document.

Beeb HandScan & Firmware **£99**

Archi Mk II Hand Scanner

Watford's Mk II hand scanner has a maximum resolution of 400 dpi. The scanning width is 4". The sophisticated software is supplied in a 64K ROM, located on a standard single width expansion podule. As you scan a page, the image appears in the scanning window on the screen, scrolling up in real time. Other facilities include Cropping and scaling to any size including stretching and squashing in X and Y directions separately. Colour tinting. X and Y flip. Edge detection which turns solid objects into outlines.
Images can be printed on any printer supported by RISC OS.
On-screen help is provided via the RiscOS interactive help facility. (Please write in for full technical details).

AHS-4 Archi 300/400 Version £109
AHS-3 Archi A3000 Version £119



Winner of the BBC Acorn User 1990 Award for the Best DTP/Word Processor

The Wapping Editor

The Wapping Editor from Watford Electronics represents a breakthrough in Desktop Publishing for the Beeb. The package includes a 64K ROM containing ALL the software needed to get into print fast; a very sophisticated graphics module, professional quality typesetting software, a word processor, a comprehensive font editor for designing your own typefaces, and a variety of printer dumps. This mouse-driven system is designed for the BBC B, the B+ and Master computers and will take full advantage of any Sideways and Shadow RAM that may be fitted. It will run under DFS, ADFS and Network filing systems and requires as a minimum just a single 40 track drive.

Included with the system is a utility disc containing several high quality fonts, various utilities and a ROM image of a Support ROM. A comprehensive 100 page manual completes the package. The Support ROM contains routines to allow an area to be rotated to any angle or distorted to any four-sided shape. Also included are facilities to draw ellipses at any angle and sectors, segments and arcs (in Master or BBC B with Acorn GXR). Another of the features of the Support ROM is a 'Turbo DFS' which gives DFS access times comparable with those of ADFS.

Page Layout Section

The Wapping Editor may be used to create pages of any size from an A6 to a full A3 page. If none of the eight default page types suit your purpose, the stand-alone page creation program may be used to create pages to your own requirements. By using proportionally spaced fonts and genuine microspacing it is possible to print over 150 characters across an A4 page. A unique feature of the Wapping Editor is the 'A5 x 2' page size allowing two A5 pages to be printed side by side onto a single A4 sheet.

The graphics module incorporates the facilities like: pencil, brush, airbrush, polygon, circle, eclipse, fill, cut & paste, etc.

Text may be typeset, either justified or unjustified, in any font anywhere on the page. Simply select which font and text document you wish to use, and pull out a rectangle on the page where you want the text to be – it's as simple as that! Multiple columns may be printed just as easily and a special 'expand' feature may be used to expand the microspacing so that the document exactly fits the space defined.

Word-Processor

The integral word processor is the ideal tool for producing your text documents, although text can of course be read in from any of the other popular word processors such as View, Wordwise etc.

The Font Editor

The font editor module will allow you to design your own typefaces or to modify the ones provided on the utility disc. This sophisticated editor has numerous functions designed to take the tedium and frustration out of producing good looking, well balanced fonts. Each character may be individully proportionally spaced and characters of any size up to 16 x 16 pixels may be defined.
Pictures may also be 'grabbed' from a video source by using the Watford BEEB Video Digitiser.

Wapping Editor Software Pack	**£49**
Wapping Editor plus Mouse	**£69**

(Wapping Editor only works with Master Compact if a Mertec Expansion box is fitted)

Wapping Art Disc

Over 250K of clip art to cut and paste into your Wapping Editor pages. Pictures include maps, transport, people, media, sport, games etc.
Two 'ratio' screens for use with hi-res and rotated A5 pages to ensure images are not distorted when printed out.

Music writing symbols in the form of pattern and brush for quick production of manuscripts are included together with staves.

There are two prepared hi-res pages laid out for printing labels, both single and double width. Ready made label designs are included but these can be easily replaced with your own designs.

A Mode 0 screen dump routine is also included. To pack such a large amount of data onto the discs the screens have been compressed and routines to compress and expand Mode 0 screens are included on both discs. Using the packing routine you can archive large numbers of screens onto a single disc.

£15

Wapping Font Disc 1

Sixteen additional fonts, including smaller version of Oberon and Daisy and two new sizes of the standard font for the Wapping editor.
Also included are two Mode 0 screens containing giant 'headline' fonts to cut and paste to create extra smooth headlines.
Supplied complete with instructions.

£12

Wapping Font Disc 2

This new addition to our Wapping range of DTP software provides you with additional 23 fonts for the Wapping Editor DTP pack. (80 track discs only).

£13

Archi A4 Scanner

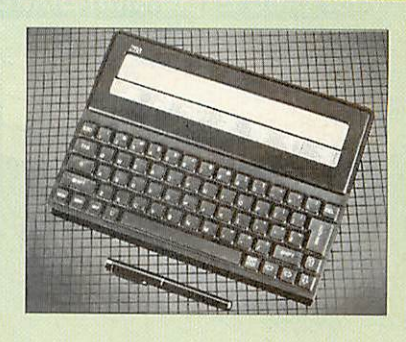


This most advanced Archi A4 image scanner is supplied complete with ROM based podule software. Features provided include facilities for zooming in on an image and inverting the image in X and Y directions, saving and printing of the sprite created. Interactive help is supplied using the !HELP application on the Acorn applications discs.
The 216mm scanning width can cope with both desktop scanning of single sheets, photographs, diagrams, etc., with its fast ten page automatic document feeder, but it can also detach from the feeder to become a convenient hand-held full page scanner for larger documents or pictures.
Scanned image control can be freely adjusted in increments of 10 dots per inch from 100 up to 400 dpi resolution with 64 levels of grey scaling. A built in shading controller and manual brightness control achieve optimum image clarity.
Unlike some scanners, which use a red light source, the Watford scanner uses a yellow/green source which vastly improves the light/dark contrast, thus eliminating the effect where any red-based colours are faded down to white and so do not show up in the scanned image.
All these features and facilities combine to make the Archi Page Scanner the fast and convenient way in which to add that extra impact, interest and clarity to documents, reports, instruction sheets, manuals, news letters, etc., from your Archimedes DTP package.

New Low Prices:

Archi A4 Scanner	£269
Sheet Feeder for above	£75
Scanner + Sheet Feeder	£359

Z88 Portable Micro



• Z88 Portable Micro	£169
• 32K RAM Pack or 32K EPROM Pack	£16
• 128K RAM Pack or 128K EPROM Pack	£32
• 512K RAM Pack	£86
• 256K Eprom Pack	£55
• Z88 Eprom Eraser Unit	£38
• Z88 Carrying Case	£8
• AA Nicad Rechargeable Battery	£1.50
• Battery Charger Compact & Fast	£6
• Z88 Serial Printer Cable	£8
• Z88 Parallel Printer Cable	£18
• Z88 to Archi Link	£15
• Z88 to BBC Link £8	• Z BASE £56
• Z88 to PC Link II £27	• Z88 to Macintosh £32
• Z88 Mains Adaptor £9	• Z88 Modem £114

Psion Series III



Psion, pioneer of the handheld computer, have once again redefined the state-of-the-art with the Series III. Although only pocket sized, this powerful programmable computer has many features found in desk top machines, plus powerful built-in software. They include a full specification wordprocessor and an outliner that is compatible with Microsoft Word, an extensive database, intelligent time and personal management and a powerful multifunction calculator. And with an interchangeable memory of up to 4Mb, you'll never be short of data storage space.

Psion Series III Computer

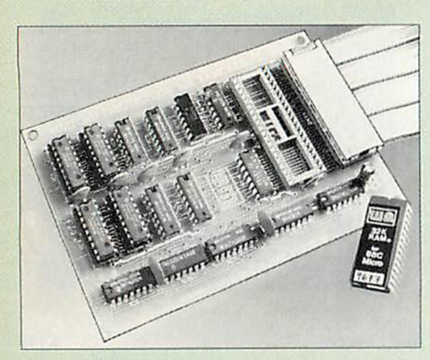
• Series 3 128K	£139
• Series 3 256K	£179



CREDIT CARD 24 HOUR Ansaphone Hot Lines (0923) 250234 or 233383

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32K Shadow RAM/Printer Buffer Card Expansion Board



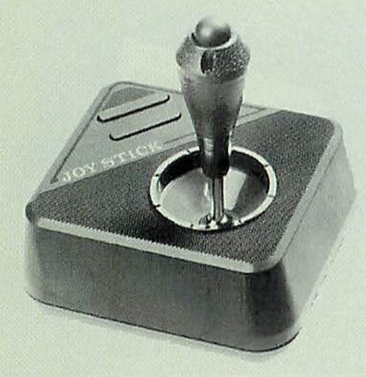
A MUST FOR WORD PROCESSING

Simply plug the ribbon cable plug into the 6502 socket and gain a massive 32K of extra RAM.

- "VIEW" Wordprocessor users can now type in letters in 80 columns and have up to 28K bytes free – 5 times as much as normal.
- In WORDWISE (or WORDWISE-PLUS), preview in 80 columns with the full 24k of text in memory. This product is recommended as an ideal complement by Computer Concepts.
- Use the full 32k or the bottom 12K of the expansion RAM as a printer Buffer. (P.S. Only 12K printer buffer can be used with Wordwise & WW+, due to the way they are written).
- Unique facility to turn ROMs off and on again.

Only £49

Commander Joystick



Features:

- Direct connection to BBC Analogue input port – no interface needed.
- Fully compatible with all BBC Joystick controlled games programmes.
- Switchable springs allow selection of floating or centring operation.
- Trim adjusters for both X and Y axes for fine centre adjustment.
- Convenient stick mounted fire button with additional base buttons.

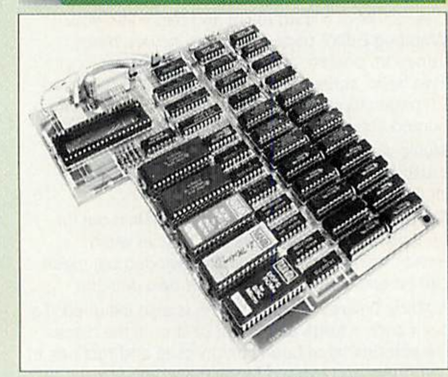
Price: £15

(PC version of above joystick available at **£16**)

Voltmace Joysticks

Delta 3B Single Joystick	£10
Delta 3B Twin Joysticks	£15
Delta 14B Single Joystick	£11
Delta 14B/1 Adaptor Module	£12
Transfer Software Disc-Tape	£7
Delta-Cat A mouse eliminator Joystick for the Archimedes	£24
Analogue aircraft style yoke Joystick to run in the analogue port of the BBC B & Master 128	£25

ROM/RAM Card



- No Soldering required to fit the board.
- Compatible with BBC B
- Total number of ROMs increased from 4 to 8.
- Up to 8 banks of sideways RAM (dynamic).

PRICES:

- ROM/RAM card with 32k DRAM — £39
- ROM/RAM card with 64k DRAM — £52
- ROM/RAM card with 128k DRAM — £83

OPTIONAL EXTRAS:

- 16k plug-in Static RAM kit — £8
- 16k DRAM for Upgrade — £13
- Battery backup — £3
- Read and Write protect switches — £2 each

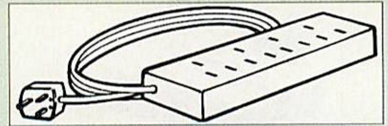
Complete ROM-RAM card with all options fitted — £109

Surge Protector Plug

Fitted in place of your normal mains plug, this device protects your equipment (and data from corruption), against mains high voltage translent spikes/surges caused by lightning or thermostats switching.

Protection for only **£8.50**

4 Way Mains Distribution Socket



4 way top quality mains trailing sockets.
Supplied wired up with mains plug ready for use.
Can be screwed to floor or wall if required.
Very useful for tidying up all the mains leads from your peripherals.

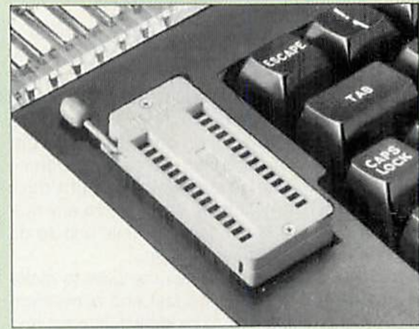
£9.50

Aries Spike Cleaner Unit

A 4 way mains distribution unit as above with a built-in Surge Arrester, providing protection for your complete Computer/Hi-Fi System

£16

Sideways ROM ZIF Socket System



Allows you to change your ROMs quickly and efficiently, without having to open the lid. The ZIF socket is located into the ROM Cartridge's position. It is very simple to install. No soldering required. Also included in the price is a plastic see through storage case with antistatic lining, which allows you to store 12 ROMs.

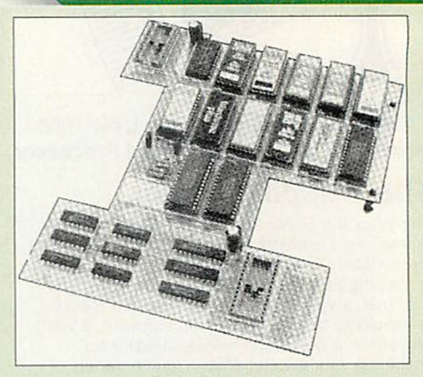
£18

ROM Cartridges for the BBC Master

Will accept the larger Piggy Back ROMs like Interword, Quest, etc.

- Twin **£8**; • Quad **£13**

Solderless Sideways ROM Socket Board



- Increases your BBC Micro's ROM capacity from 4 to 16.
- **No soldering required.**
- Socket 14 takes two 6264 RAM chips.
- Read protect to make RAM "Vanish" allows recovery from ROM crashes.
- Battery backup option for RAM chips.
- Supplied ready to fit with comprehensive instructions.

Price: Only £32

Battery Backup fitted **£35**

Battery Backup only **£3**

16K Sideways RAM **£8**

- Sideways RAM Utilities Disc for Solderless ROM Board. Includes the options to load and save ROM Images and the facility to use Sideways RAM as Printer Buffer.

Only: £8

Disc Drive Power Leads

Supply from BBC power supply to standard Disc Drive Connection: Single **£3.00**; Dual **£3.75**

Disc Drive Interface Leads

BBC to Disc Drives Ribbon Cable
Single **£4** Twin **£6**

Miscellaneous Connectors

	Plugs	Sockets
RGB (6 PIN DIN)	50p	75p
RS423 (5 pin Domino)	70p	80p
Cassette (7 pin DIN)	40p	95p
ECONET (5 pin DIN)	35p	50p
Paddles (15 pin 'D')	150p	250p
Disc Drive Plug 4 way	100p	–
6 way Power Connector	120p	150p

Watford DATA DUCK

Convert two single Disc Drives into one Dual Drive with this simple external unit (Suitable for Disc Drives with PSU. For Disc Drives without PSU, you will also require Watford Power Duck, see below).

£14

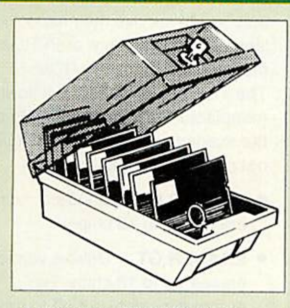
Watford POWER DUCK £8



CREDIT CARD 24 HOUR Ansaphone Hot Lines (0923) 250234 or 233383

All Prices Exclusive of VAT

Antistatic Lockable Disc Storage Units



- **M35** – holds up to 50 5.25" discs £4.95
- **M85** – holds up to 95 5.25" discs £6.95
- **M25*** – holds up to 25 3.5" discs £4.95
- **M50** – holds 50 3.5" discs £6.50
- **M100** – holds 100 3.5" discs £6.99
- **M10** – holds 8 of No. 10 Data Cartridges £15

* Not lockable

Disc Plonker Rack



When using ones micro, there is a tendency to have more than one Disc on the desk. This exposes them to the hazards of fingerprints, scratches, dust, coffee and an untidy desk. Why not protect your valuable data from all these hazards with the help of our extremely handy and low cost DISC PLONKER RACK. Holds up to eight 5.25" discs.

Protection at Only: £2



3M – Diskettes

Lifetime warranty on 3M Discs

- *10 x 5.25" S/S D/D 40T (744)* £5
- *10 x 5.25" D/S D/D 40T (745)* £5
- *10 x 5.25" S/S D/D 80 Track (746)* £7
- *10 x 5.25" D/S D/D 80 Track (747)* £7
- *10 x 5.25" 1.6M D/S D/D High Density for IBM XT and AT* £8
- *10 x 3.5" S/S D/D 40/80 Track* £6
- *10 x 3.5" D/S D/D 40/80 Track* £6
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CLD35:	Twin Disc Drives, 800K	£109
	Disc Drive with PSU	
CS35:	Single Disc Drive, 400K	£82
CD35:	Twin Disc Drives, 800K	£126

(P.S. CS35 is supplied in a twin case with a blanking plate to enable easy expansion to a dual drive at a later stage)

Disc Drives in Monitor Stand



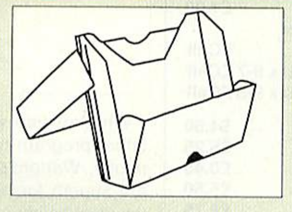
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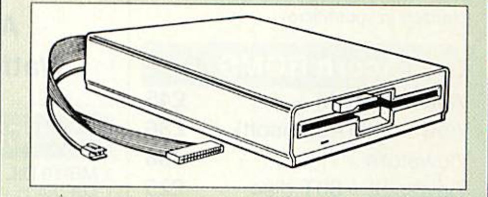
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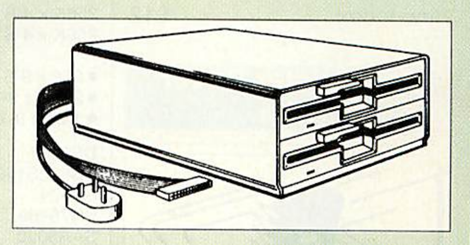
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Our Disc Drives conform to BS415

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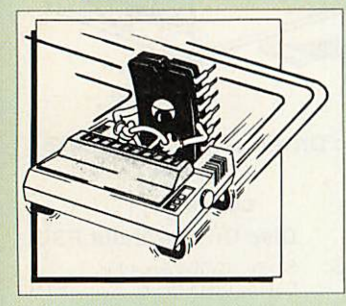
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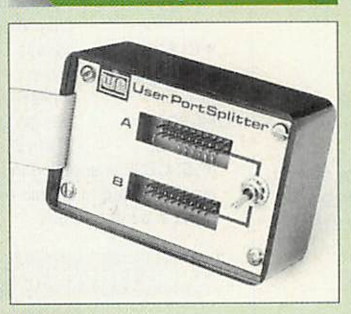
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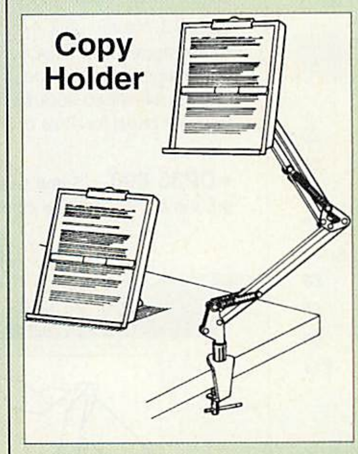
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The Complete BBC Computer User Handbook

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(Now reads Archimedes Discs)

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This manual has been written to reveal the secrets of the mouse. It explains all the principles required by the hardware and associated software, and also example listings for inclusion into custom programs. The manual first details the basic principles of the mouse and a simple program which uses these principles. This information should be adequate for most applications. However, it is possible to improve the performance of the mouse by expanding on the principles already used in the software. This is again fully explained and an example program given.

It is possible to gain a full understanding of the mouse from this manual. For those not interested in exactly how the mouse functions, complete example programs are also included.

Price £5.95 (No VAT)

Example programs on Disc £4.95

The Epson RX/FX Printer Commands Revealed Handbook

So you bought yourself a new printer, because the salesman in the shop showed you how clever it is and impressed you with all sorts of printouts to show its capabilities – he may even have offered you a special price.

However, now that you have got it home and connected it to your BBC microcomputer, you are wondering how to make it perform these magical tasks. The manual seems to give no clues, and when you type in the example programs, the computer throws the LPRINT statements back in your face.

Now what do you do, when this £400 piece of high technology refuses even to move its head, and you have stayed up until 2 in the morning with copious supplies of coffee, desperately trying to print something out? Once again, Watford Electronics comes to your help with our new book entitled 'THE EPSON FX-KAGA PRINTER COMMANDS REVEALED'.

This book describes in plain, easy to understand English, how to use and make the most of your KP810, PW1080A or any other Epson FX80 compatible printers like Panasonic KX-P1080/1, etc., with the BBC Micro, both from Basic and Wordwise.

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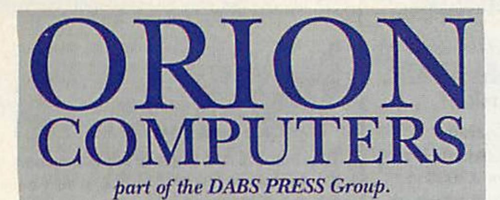
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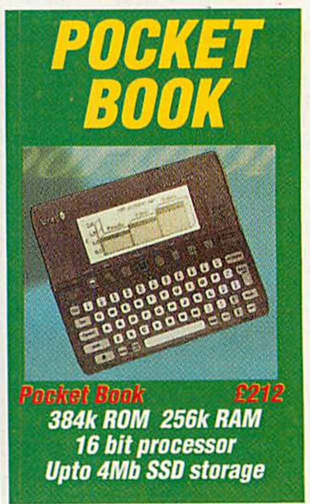
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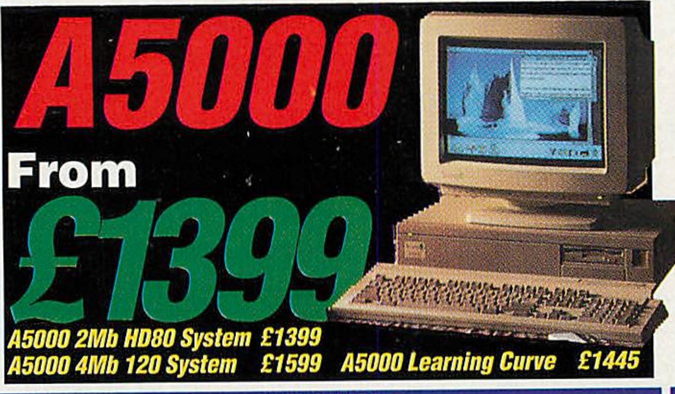
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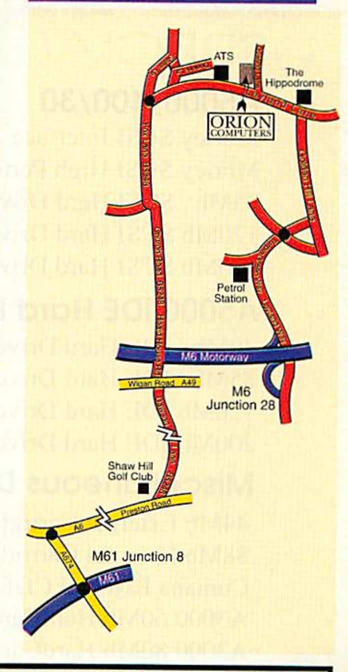
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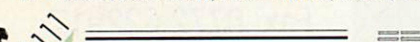
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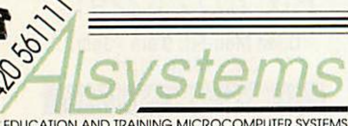
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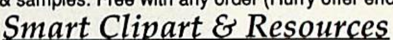


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RUNNING NEW RISCS

You've just acquired your first Acorn machine. But how do you get access to all that computing power? Paul James offers a guiding hand

Over the next few months we will be explaining how to use the applications that you may have with your Risc OS 3 machine, and, more importantly, how to use them together so that they complement each other. First of all, it's important that you know what certain parts of the desktop are called.

Turn on your machine. The desktop that you see is your work area; at the bottom you can see the icon bar and on the right hand side of the icon bar you see the *Task* application (the acorn) and next to that the *Palette* application. These applications are resident on your icon bar all the time. Other applications such as *Paint* and *Draw* can be added as you like.

On the left-hand side of the icon bar are the device icons, relating to physical devices, such as the floppy disc and hard drive if you have one.

Take hold of the mouse and click on the floppy drive icon. This catalogues the current floppy in the drive. Of course if the floppy drive is empty then you'll be told. If you have a floppy disc in the drive then you'll be shown what is on it in a filer window that appears on the desktop.

If you have a hard disc you'll have another icon, probably on the far left hand side of the icon bar. This brings up a viewer of the root directory of the hard disc, just the same as the floppy drive icon brings up the root directory viewer of the floppy disc.

The *Apps* folder is yet another example of a filing system, except this is a special filing system. This folder is just like another floppy disc drive, except the floppy disc takes the form of several chips which are inside your computer. This means that the *Apps* folder is on your icon bar all of the time. Click on it, and up will come another directory viewer, containing applications such as *Paint*, *Edit* and *Draw*. Applications stored in this filing system will load much faster than those from the hard or floppy disc.

At the moment these applications are just sitting in a filing system, and are not doing anything. To make an application active you have to put it onto the icon bar.

The mouse is your way of telling the machine what to do. There are three buttons on the mouse. From left to right they are Select, Menu and Adjust.

Move the mouse around, and watch the pointer on the screen; it moves with it. By placing the pointer and clicking with Select or Adjust then you activate software applications on the desktop.

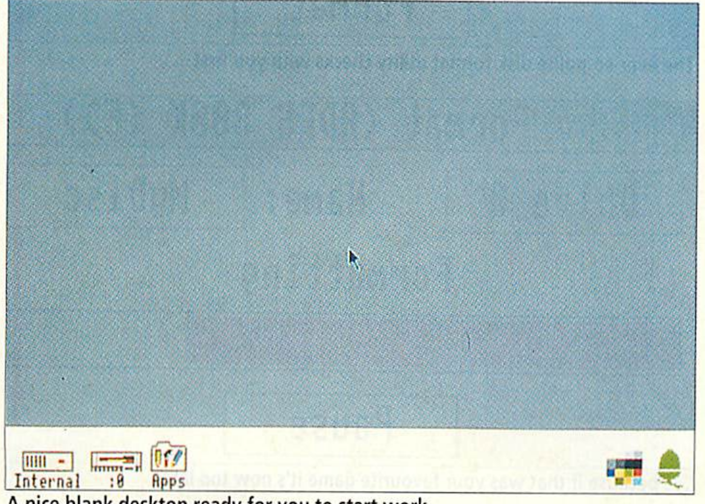
A single click is made when you press Select once with your index finger. Place the pointer over the *Application* folder on the icon bar, and single click. You'll find this has the action of cataloguing the *Applications* folder, that is, showing you what's in it. What has popped up on the screen is a window. Inside that window are the applications that every Acorn user has.

Risc OS revolves around menus, which are accessed by pressing the Menu button. Move the pointer over the freshly popped up window, and click the Menu button. This Menu is for that window only; if there were another window on the screen then this would have its own menu too.

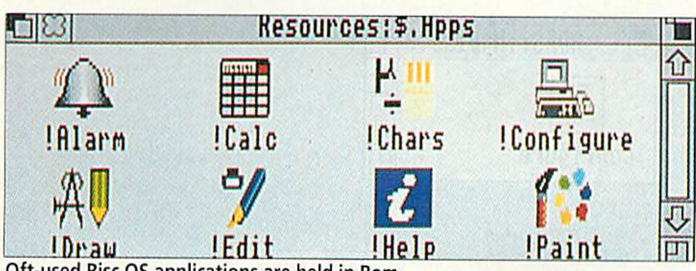
To choose an item from a menu, you simply highlight it in black and single click. Move the pointer up and down the length of the menu and watch the black bar, when you need to click to choose the menu item.

Menus have submenus: you may notice the small arrows that lead off the right hand side of the menu. Move the pointer to the arrow on the right of the Display option, this makes another Menu open up, which is the submenu. This submenu has several options that alter the appearance of the window; try selecting a few by clicking with Select on them.

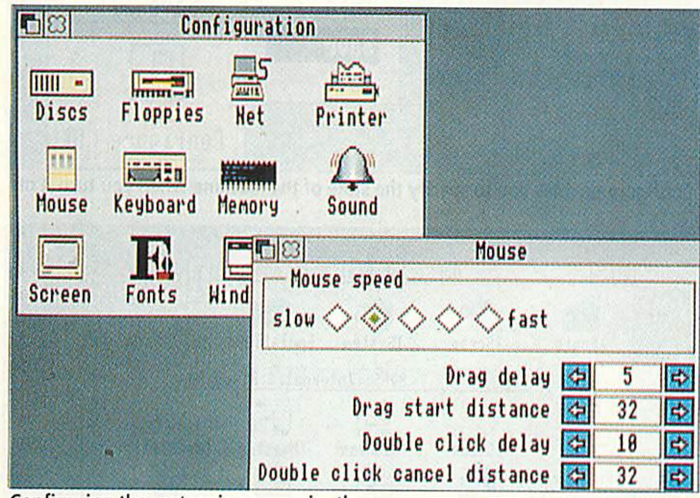
Now you'll begin to realise why the Adjust button is there. Press Menu over the window again, and move over display. Now try clicking on the Menu items with Adjust, and watch



A nice blank desktop ready for you to start work



Oft-used Risc OS applications are held in Rom



Configuring the system is now easier than ever

what happens. The Menu stays there; you are adjusting its choices, rather than selecting them.

CONFIGURE

Your machine has a little bit of memory that, even when the machine is turned off, remembers what was put in it. This part of memory is used to store information on how your machine should be when you turn it on.

If you haven't got the Risc OS Applications window up on screen then click on the Apps icon on the icon bar. You are going to load the *Configure* application onto the icon bar so that you can alter this configuration.

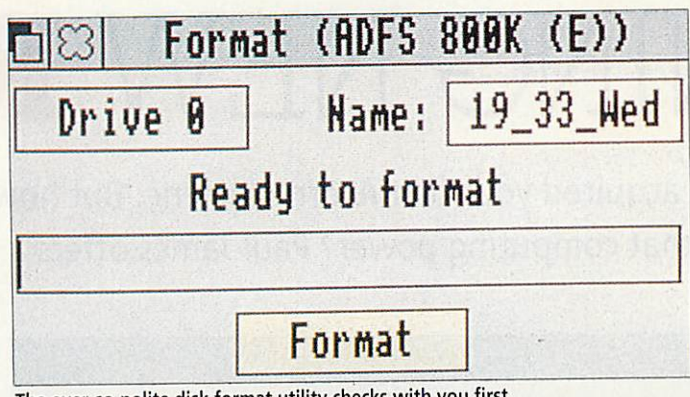
Double click on the Configure icon in the window, and it will appear on the icon bar, in the bottom right hand corner of the screen. Now close the Apps window by clicking on the small cross in the top left hand corner.

Configure should now be on the icon bar. At the moment, though it is dormant, click on it to bring it to life. A window will pop up with the word Configuration in the Title Bar. Each icon can be used for adjusting a certain aspect of your machine.

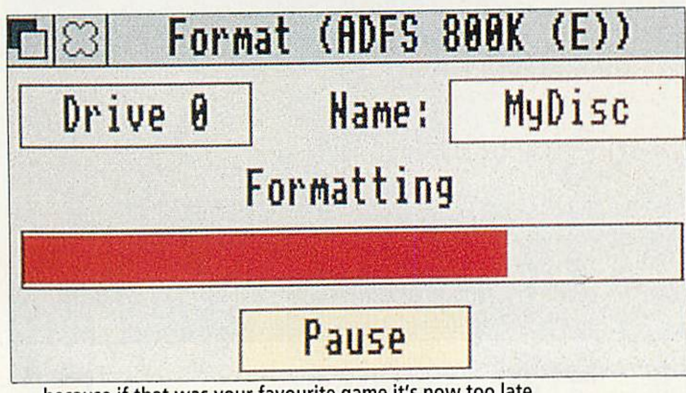
Go straight to the Mouse icon, and click on it. Ignoring the options below, try clicking on the radio buttons that range from slow to fast. This alters the speed of the mouse. It's entirely up to you how fast or slow you want the mouse to go, but once you've set it it will stay like that, until you reset it some other way.

Now close the Mouse window and click on the Applications window. This will allow you to specify which applications are loaded when you turn on your machine. Try clicking on *Paint*, *Draw* and *Edit*, so that a little star appears in the box next to them. Each selected application will now load up automatically. To stop them loading automatically click on the star so that it disappears. Now try the sound icon.

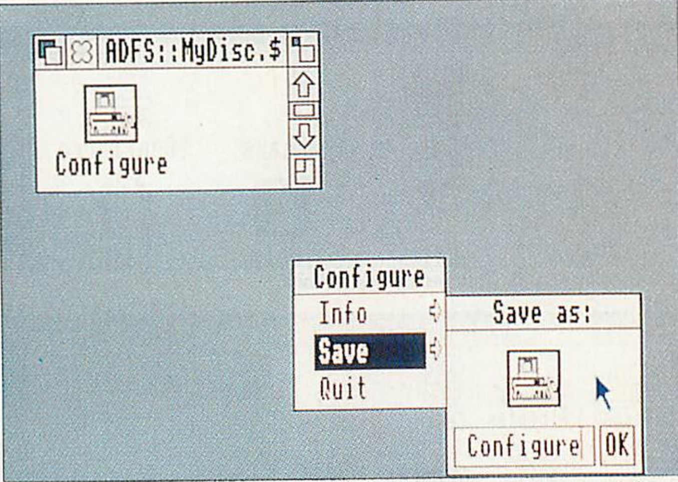
Memory management is thankfully something that your machine will do for itself. There are however a couple of changes you should make to the initial configuration. Use



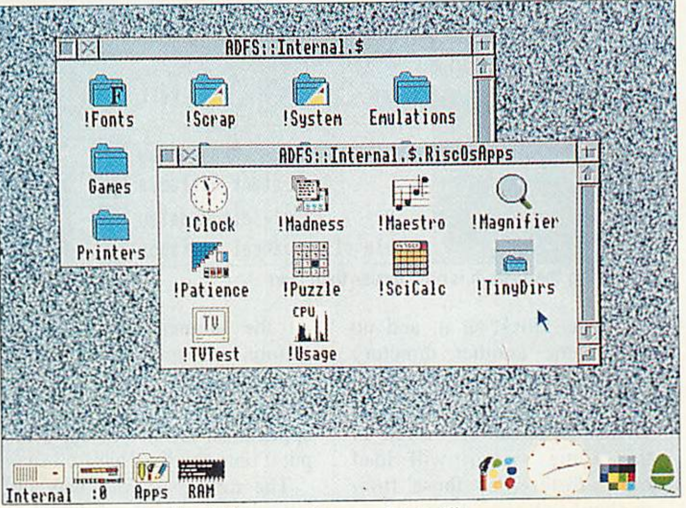
The ever-so-polite disk format utility checks with you first . . .



. . . because if that was your favourite game it's now too late



Configure enables you to specify the state of the machine when you turn it on



Applications on the hard disc range from useful to silly

the bumpers to increase and decrease the value of each memory area. In the end you should only have extra memory for the Font cache, about 70K, and all the other areas should be set to zero.

DISC FORMATTING

Formatting a disc is simple. Press Menu over the floppy drive icon, and move over onto the Format sub-menu where you should have a list of four types of disc format; there may be less if you are using Risc OS 3 on an older Acorn machine; notably the ADFS 1.6Mb format will be missing.

Each format here serves a different purpose. ADFS 1.6Mb is a special large format. ADFS 800K E format is the one to use if you want to keep in touch with somebody with an older Acorn machine, and ADFS 640K E format is used when keeping in touch with Acorn Users who have eight-bit machines.

For the moment, choose ADFS 1.6Mb if you have a high density floppy in the drive, and 800K E for a low density floppy. A window will pop up on the screen, awaiting your command. Click on the Format button on the window and away it goes. If it doesn't go away and it reports the error 'Protected Disc' then move the little tab on the disc so that you can't see through the hole.

While the progress bar is Red the computer is writing the format to the floppy disc. When it has finished it will check it has formatted the disc properly (this is known as verification), and that there aren't any areas of the disc that may cause an error.

If the green bar stops and an error message pops up in the window, it means that the computer has found such a place. Click on OK. Don't worry if you get a couple of these errors; the computer will write on the disc where these errors occur, and will ignore them after that. If you get more than ten, then I should dispose of the disc.

Now you have a formatted floppy and you can save a file onto it. Try doing this with your new *Configure* file. I'll leave you to find the menu option for this.

MORE THAN A SHADE BETTER

Graham Bell looks at the latest in colour and resolution

When the Archimedes was first released in March 1987), its display system was nothing short of astounding. But the intervening five years have seen only a little progress, and the Arc has lost its pre-eminent position. An 800×600 16-colour screen, top whack on an Archimedes, screen is now viewed as an acceptable minimum on PCs.

A clutch of new products have recently tried to free the Archimedes from its restrictions. They promise new screen modes with greater resolution on screen, more colours and an even faster Archimedes at the end of it. So do they deliver?



A colour enhancer can give your screen near-photographic resolution; this example is from Kodak's Photo-CD disc

ADDING A CARD

Computer Concepts' ColourCard and the G8 Plus graphics card from State Machine are all but identical in conception, and add a new higher resolution display system on one podule.

Both consist of well-made expansion cards, which are slotted into the backplane of your computer in the usual way, plus a single ribbon cable. This has to be fitted between the card and the genlock connector of your machine – very early Arcs are missing this set of pins, but they can easily be added by a service centre if required.

With the Computer Concepts card, another cable goes from the computer's video out port to the card, and the monitor connects to the card. With State Machine, the monitor stays connected to the computer until you've configured the card, and is then moved so it only connects to the card. Both nine- and 15-pin connections are provided for the monitor, but the CC card has only a 15-pin outlet, so you do need to make sure you have the right monitor cable.

Because of the lack of a 'proper' podule slot in the latest A3010, A3020 and A4000 machines, the cards cannot be used, but you could fit either of the cards to an A3000 using an external podule case.

SETTING THEM UP

Configuring the Computer Concepts' ColourCard is simple – you don't have to. There is a selection of software on a disc, which needs to be transferred to your system floppy, or more likely to your hard disc. This includes *FlipTop*, a mode-picker utility which allows you to choose a screen mode with the mouse, and a replacement palette utility to control the colours in the card's new screen modes.

Finally there are a selection of 'mode modules': at least one of these needs to be put into your *System* folder, and you'll usually want to add a couple of lines to your *System* Boot file to ensure the new module is installed when you start up.

G8's card comes without a disc. But the company has played a neat trick by putting all the necessary software – an almost identical mode-picker and palette utility – into the Rom on the podule itself. You can get at it by clicking on *Apps*: it appears together with the other built-in applications like *Draw*, *Paint* and *Edit*. This is extremely convenient.

Configuring the card the first time you use it is more complex, but the steps are explained well enough in the manual. I had a little trouble with G8's early review software as, during the configuration process, all the screen colours changed to white, so typing in the later steps meant typing 'blind', but this problem shouldn't be present in later production cards.

Both cards are in some way 'monitor specific'. Acorn's classification of normal, multisync, VGA and SVGA monitor types is too simple to cope. Computer Concepts provides mode module software that's 'tuned' for each common monitor. G8 relies on a more comprehensive monitor type number scheme, with extra choices like whether your monitor has digital picture sizing controls or not.

It would be useful to have a list of common monitors, and which group they fall into, included in the G8 manual, but once you've worked it out, it need never be touched again.

In use the cards perform almost identically: both give bright, clear pictures in normal modes, as good as the normal Arc video. Neither introduces any noticeable extra interference into the picture. But they work in quite different ways. The ColourCard passes

through the Arc's own video signal, cutting in only when you choose a new mode; the G8 card is permanently on, and emulates the usual modes 12, 20, 27 and so on.

The cards offer three classes of improvement. Most spectacularly, they give more resolution. While most users stick to 640×256 (mode 12) or 640×400 (mode 27), the graphics cards both offer 1024 by 768 in 16 colours and even 1280 by 1024, albeit in only four colours.

These resolutions transform the desktop, giving you space to have a full A4 page at 100 percent size, plus an area to show directories or other software. If you're used to working in mode 27, the effect is nothing short of revolutionary: 1024×768 gives you well over twice as much screen area to play with – area to use the pinboard, to keep your disc directory windows in view, to keep all your *Revelation* tear-off menus and so on.

The second major benefit of both cards is their freedom from flicker: most Archimedes modes have a refresh rate of 50 or 60Hz, and most people can perceive flicker – especially with bigger monitors or when most of the screen has a white background. The cards raise the refresh rate to 70Hz, at which flicker becomes imperceptible. The screen looks steadier, and for employers facing new EC directives on computer ergonomics, eliminating flicker is an important factor. The G8 card also implements flicker-free versions of many normal modes, which also make these modes full-screen on those monitors that otherwise show mode 12 in 'letterbox' format.

With one of these cards you can get a lot more on your screen; this is a 1152××848 16-colour mode

The third benefit is that the palette is programmable in 256-colour modes. Both cards implement a new mode 32, the same 'size' as mode 31, and come with a number of new 256-colour palette files. Both cards emulate Acorn's default palette, and offer 256 grey levels on screen, or a primary colour palette useful for Artworks. State Machine includes a 192-grey palette; enough greys to give perfectly smooth graduated tints on screen, combined with 64 colours including the normal desktop colours; ideal for DTP work.

There's also a primary colour palette that's optimised for the colour dithering that *Artworks* uses, and a VGA palette for use with the PC Emulator. Computer Concepts includes a similar selection, as well as a unique 'printer palette' that does a surprisingly good job of emulating on screen what you will get if you print out the screen on a decent colour printer.

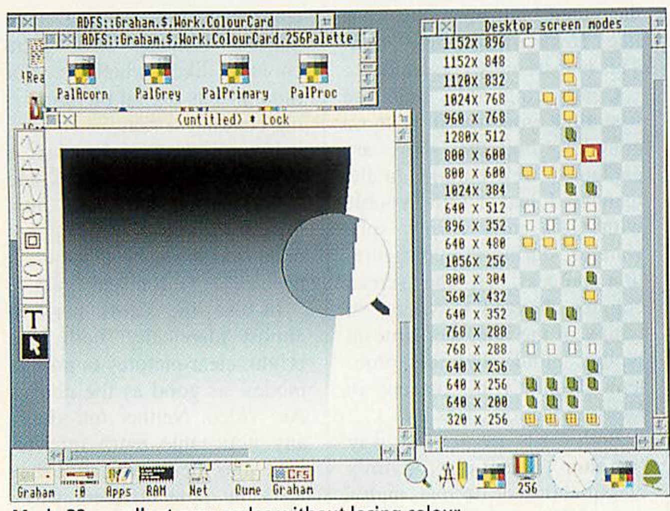
The final advantage offered by the cards is a minor one. By slowing down the Archimedes display frame rate, though maintaining the card's output rate to avoid flicker, the Computer Concepts' card increases the processing speed of your Arc by a few percent. This however, does create some disturbing effects on screen – where moving windows seem to tear in half briefly, for example. State Machine avoids these slow modes. The difference in speed is measurable, but on an Arm3 machine is barely perceptible.

One important factor in all this is your monitor. Unless you have a good monitor, then the improvements a colour card makes will largely be wasted. On an Acorn Multisync, such as is supplied with the A5000, a resolution higher than 800×600 pixels just makes things smaller and seemingly more blurred. A quality high line-rate multiscan is vital to appreciate the improvements in resolution.

The G8 works with most digitally-controlled multisyncs, but some, particularly the Eizo F550 and T560 models, do not work satisfactorily – the picture is distorted at the top of the frame.

This was at first true with the Computer Concepts card supplied, but CC was able to fix this perfectly with a new mode module. It is vital that when purchasing a card, you check out the compatibility with your existing or proposed new monitor. Both companies are negotiating with monitor manufacturers to offer monitor and card bundles that will ensure a perfect match.

Another area of compatibility worry is with existing software. Unlike previous graphics upgrades such as the PCATS card, both colour cards are fully desktop-compatible. So most software – barring games – will run and take advantage of the new abilities of the cards. Games often don't, particularly with the State Machine card because of its emulation of 'normal' modes. But then, with a high-quality monitor, many games don't run satisfactorily anyway.



Mode 32: excellent grey scales without losing colour

Computer Concepts' card does support a 32,000-colour non-desktop mode which gives rather low-resolution but almost photographic colour quality. When software appears to make use of this, it will offer the ability to display very high quality pictures, such as the example taken from Kodak's Photo-CD demonstration system. State Machine does not support such a mode, but plans to with its forthcoming G8 Professional.

DO YOU NEED ONE?

The bottom line is that if you feel able to spend £500 or more on a monitor, then an extra £300 on a colour card is probably money well spent. Monitors like the Eizo F550i, Taxan 795 and Watford's Aires Alphascan range are capable of more than a standard Archimedes can offer, and either graphics card makes a good choice.

But monitors like this are not for everyone: most current Arc buyers get an Acorn monitor and stick with that. More professional users, or those with a keen graphics interest are the main upgraders, and many choose a model like the old Taxan 770 or Eizo 9060 specifically because they're flexible enough to work in mode 12 as well as the VGA and SVGA modes.

This means that the 770 or 9060 buyer keeps full games compatibility. But the 770 or 9060, like Acorn's own multisync, are not really designed for working at more than 800×600 resolution. They do work at higher resolutions, but don't have the clarity of the higher priced screens. If you're prepared to forego most games, and pay the extra for high-resolution screen, then a new graphics card is a must.

Both cards work well. Choosing between them is difficult: both do the same job well, and both cost the same. The software of the G8 is in many ways more mature, it neatly slots into the *Apps* folder and doesn't need a *Boot* file to load a mode module. But the card design is less flexible – as evidenced by the Computer Concepts card's better performance with monitors like the Eizo F550i.

Any differences in software compatibility, provision of new 256-colour palette files and so on, will soon even out as each company matches the other. Both plan further enhancements, like Unix screen drivers or compatibility of the higher resolution modes with the PC Emulator and hardware PC cards. Either card makes a good choice, but check your monitor out first.

PRODUCT DETAILS

Product: G8 card
Supplier: State Machine, Advanced House, 75 Upper Wellington Street, Luton LU1 5AA.
Tel: (0582) 483377
Price: G8 Plus – £249; G8 Professional – £349

Product: ColourCard
Supplier: Computer Concepts, Gaddesden Place, Hemel Hempstead, Herts HP2 6EX.
Tel: (0442) 63933
Price: £249

HOW THEY WORK

In a conventional Archimedes, the Arm processor draws the required image into an area of memory called the screen buffer, setting the patterns of 0s and 1s in memory to match the patterns of colours required on the screen. Every 50th of a second or so, this data (128K of it in mode 27, for example) is read out of the screen buffer by the VIDC. Each number from memory refers to a pixel on the screen, but the number read doesn't directly determine what colour appears: instead, it is used to look up an entry in a colour table, called the palette, so number 0 from memory is normally white and number 11 is red. There are 16 such palette entries. The video signals come out of the selected palette register, go through a digital-to-analogue converter and appear on the monitor.

The palette utility on the icon bar allows you to alter the contents of the colour table, thus linking number 11 to any colour you want; or rather any colour that VIDC can produce. Since each palette table entry is only 12 bits wide (four bits each for red, green and blue), if you want a shade of pure grey, you have only 16 to choose from.

Because Arm and VIDC share the screen buffer Ram, they have to contend for access time; so in modes where VIDC has to read more data for every frame, it has to take a higher proportion of the available time, leaving Arm with fewer memory cycles. Arm sometimes has to pause while VIDC uses the memory before getting its next instruction, so that the overall processing speed of your machine slows down.

Essentially, the problem is this. There is a fixed amount of memory access. You can share it out between machine speed, number of pixels, number of colours and the screen refresh speed. Each different mode represents a different trade-off between these four factors. More pixels and more colours slow down your machine, or a slower refresh speeds it up but makes the screen flickery.

If you have an A5000 or A540, then higher resolution screen modes don't slow the machine to the same degree, because these machines have fast memory and the Arm3 can often continue processing using instructions already stored in its cache, without having to pause to wait for VIDC. But 'VIDC enhancer' devices on Arm2-based machines make things much worse: they allow you to have lots of pixels on screen, but they slow down your machine and many screen modes are very flickery.

The colour cards add an extra layer to this system. As the picture data emerges from VIDC on its way to the monitor, it is intercepted and stored in a second video buffer – a copy of the screen Ram – on the card. This is made up of a special kind of memory chip called VRam (Video Ram) can be shared between two systems: it can be written to and read from at the same time.

As well as the VRam screen buffer, the colour card contains a second VIDC; or at least a chip that's similar in operation. In fact, both cards use an identical Inmos G332 display controller, a sort of super-VIDC which can read the screen data from the VRam, and pass the screen data through its own set of palette registers and digital to analogue convertors in exactly the same fashion as before.

So the Archimedes can just get on with drawing the screen, and 'displaying' it as before. It is copied, without the machine's intervention, into the VRam buffer. The display can have plenty of colours and pixels, because the Archimedes' refresh rate can be slowed down to compensate. Flicker isn't a problem any more, because the VRam allows the data to be read out and displayed at a different speed. So while the Arc writes the data into the VRam at 25 frames per second, it can be displayed smoothly at anything up to 70 frames per second to avoid flicker. The ultimate limit is the amount of memory that is used: VIDC places a limit of 480K on the screen buffer, so the 'biggest' screens are 800 by 600 pixels by 256 colours. Having more pixels than this means you get fewer colours, such as 1024 by 768 by 16, or 1280 by 1024 by 4.

The Arc's 256-colour modes are quite different. Normally, 256 colour modes largely bypass the palette. Numbers taken from memory do directly control the colour on screen, and the range of colours is essentially fixed.

The colour cards change this, as there are 256 palette registers, each individually programmable. And as each palette entry is 24 bits wide (8 bits for each channel), you can get 256 shades of pure grey. So the freedom you have to modify the palette in a normal 16-colour mode is extended to 256-colour modes too. All in all, the colour cards give you more pixels on screen, more control over the palette and a higher refresh rate, yet without compromising the speed of the machine.

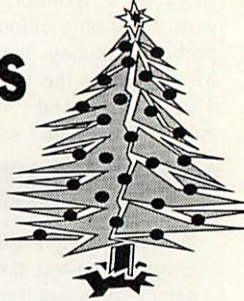
The G332 is almost identical in capability to Arm Ltd's recently announced VIDC20 chip. It has 256 palette registers, each 24-bits wide – eight bits each for red, green and blue – so can offer many more colours on screen and very much smoother colour graduations. So where the original VIDC10 gives limited control over 16 colours, the G332 and VIDC20 give full control over 256 colours. Of course VIDC20 also contains a full sound system and a control system for LCD screens, and is considerably cheaper than the Inmos chip. It may be that other Arc colour upgrades will appear in the future, based on VIDC20 rather than the G332.

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PROGRAMS

The section that is packed full of exclusive programs for you to use

Everybody wants to write a game, make lots of money and retire to a quiet place in Italy, where their collection of Porches and Ferraris outnumber the local population.

Well, it's not that easy, but this month in *BAU*, we take the first steps on the road to game fame.

Computer games are full of clever programming techniques; scrolling screens and intelligent aliens are commonplace. Dave Lawrence proves that some of the programming behind your average game is really quite simple.

As a demonstration he provides you with the basics of a scrolling game. He generates a random, rocky, landscape, but you can always change that; flexibility is the key to Dave's programs. So turn to page 67 and find out how easy it is to get a game underway. Making your fortune? Well, that's up to you.

*INFO this month is as informative as ever. First we return to fractals, with the introduction of a Julia set calculator for eight-bit machines; it's a cut above the rest. Quick and accurate, this program will create beautiful Julia patterns; fractals related to the Mandelbrot set we know and love.

Next we feature the best feature from Windows 3.1, for both eight- and 32-bit owners. *Mine* will keep your mouse finger happy in those little moments when you've nothing better to do. It's your job to find those happy little devices in among a sea of tiles. One wrong move and you're dead, but find all those mines and you're ready to take on the world.

For the aspiring programmers among you, getting keypresses is the continuing beginners' feature in this month's *INFO. This month, we show both eight and 32-bit users how to get fast input from the keyboard. We also provide a program that will tell you the INKEY negative number of any key, except the reset button of course.

*INFO's own programming challenge is drawn to a conclusion this month, with the results of the fastest maze solvers in the country. Hundreds of you sent in your solutions, and we've picked the best ten. If you didn't win this time, watch out next month for another challenge; it could be your name at the top of the list.

*INFO finishes off with our regular trip into the mind of Jan Vibe; look out for his colourful creations on page 79.

Moving on from the ever-present, almost omniscient *INFO we encounter a small patch of knitting.

Dave Acton, regular superhero, was given a pair of knitting needles, and told to sit down and work on the intricacies of the fair isle weave.

What he came up with was an enhanced version of *BAU*'s eight-bit knitting program from December 1989.

This program takes a sprite, designed by you, and turns it into a pattern, in the form of a *Draw* file. It also generates a useful text file telling you how many stitches are on each line. Either way, if you know how to knit, and you have a scanner, we expect to see lots of *Acorn User* readers walking round with *Acorn User* knitted jumpers.

Finally this month we round off with Assembly Line. Those of you who have been following Dave Lawrence's regular forays into Arm machine code programming should be really getting the Risc code together now.

What with our games programming feature, and other regular teaching features, you guys'n'gals out there should now know your machines inside out, so let's see some more of your programs . . .

Paul James



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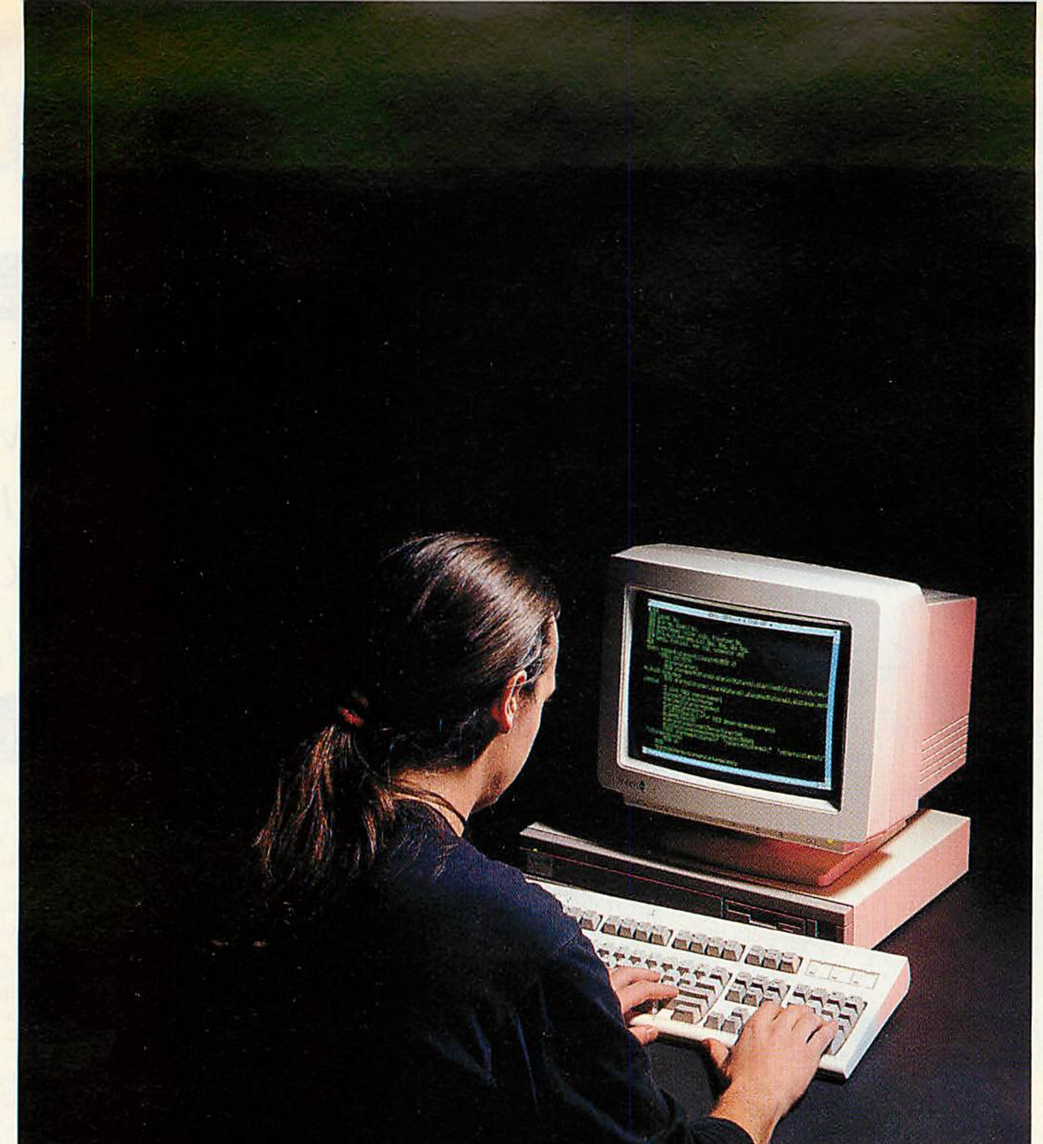
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In the first of a new series on games design, Dave Lawrence explains how to scroll smoothly

SCROLL ON

For many programmers, writing a game is the ultimate challenge, but before you can even think about creating the latest answer to *Lemmings*, there are certain vital techniques to master. The ability to scroll screens smoothly is one example.

So, to put you on the road to success, *BAU* has launched a new series to help you build up your programming skills, and you will graduate in March with a fully-fledged game. This month we look at plotting and scrolling the background.

A BIT OF BACKGROUND

I decided to embark on a scrolling, shoot-em-up game along the lines of *R-Type* or, more realistically, *Scramble*. Our game will go under the monicker of *Rocky Trader*, since it lets you, er, fly over a rocky landscape.

In most scrolling games, the scenery you fly over is not stored as one big graphic; this method is both time-consuming to design and wasteful on memory. The most common method is to have a number of blocks, in the form of sprites of various sizes. These are then stuck together to form the landscape.

Many of the 'blocks' will be fairly simple, but by combining them you can create large complex obstacles to make the game play more fascinating and addictive. The larger the blocks, the less memory you need to store the map, but the drawback with this is that there are more repetitions in the landscape.

Rocky Trade uses the 'blocked' landscape system, but as a further restriction only allows blocks of either 16×16 or 32×32 pixels to make the programming simpler: the restriction is not a problem in practice.

In *Rocky Trade* we need a number of background sprites and some sort of data to describe the scenery we fly over. To avoid the need for endless lines of data, we use two programs, *MakeLand* and *RandScape*. The former generates a collection of slopey bits of rock; the latter tacks them together to produce some examples.

The final game uses 16-colour, 16×16 sprites, but we have left the various 'hooks' in for you to experiment with 'bigger' sprites *MakeLand* will generate both sizes of sprites for either Mode 9 (16 colours) or Mode 13 (256 colours). So run *MakeLand* twice, once for each mode. Create a directory called Scenery and the bits of rock will



"Professor

Our only way to SURVIVE – to send a droid to FERVOUR for the oxygen!

is it possible"

The year is 2100 and you, professor Skitz-Patrick, are returning from a mission in search of a planet suitable for human habitation. Earth is being destroyed by ecological disasters brought on by the human race. On returning to Earth you are unable to make radio contact with anyone. All radio frequencies are jammed with the following message which repeats every minute, "Take shelter immediately, leave pets behind as they use valuable oxygen, and close your radioactive shelter..."

After close observation of your spacecraft readings you decide that some disaster has occurred since the temperature of Earth has risen dramatically. It occurs to you that it is probably unsafe to return to Earth. Unfortunately your supplies of oxygen aboard the spacecraft are limited. Though unsuccessful on your mission for a planet suitable for human habitation, you did find a source of oxygen on the surface of a planet named Fervour. You head back towards Fervour.

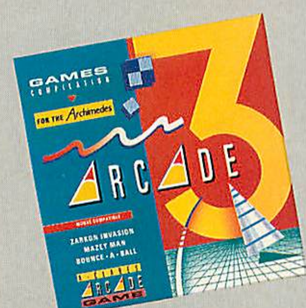
The surface temperature of Fervour is well over the range of your instruments, thus making oxygen retrieval very difficult. After several days of experimentation with oxygen retrieval you have come up with a spherical droid with as few moving parts as possible. It is impossible for you to get near Fervour because of the sheer heat, thus you must control your droid via a high frequency microwave link.

Radiating out from Fervour there are several thousand bands of varying pure energy. Your droid uses this energy to drive itself. Unfortunately, some areas have excess energy and cause strange effects. Luckily, the frequencies of radiation of the electromagnetic waves radiated from these areas are within the visible spectrum. This means that you are able to see what areas of energy your droid is over.

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be plotted, coloured and saved into that directory. For easy identification all the filenames are of the form Land<size>/<mode>. If you examine the saved files (with *Paint*) you'll find that the format is identical except for the sprite called 'palette' in the 16-colour files which simply contains the palette for those sprites.

Before we explain how to use the main editor, you'll need to create an example landscape to start working from. For this you can either type in the listing *Demo32H* (into *Edit*) and save it in the Maps directory, or you can make use of *RandScape*. *Randscape* asks a number of question about the sort of landscape you want. One of the options is the Horizontal/Vertical choice. I decided to make *Rocky Trade* scroll horizontally rather than vertically, but most of the development tools cater for either direction.

Randscape then creates a random landscape that can be used as a starting point. The other option is to use *Demo32H* which just starts you off with a small portion of landscape.

ROCKY HORRORS

The landscape editor, *EdLand*, is a simple editor. You need to load a file to start with, so make sure that either *Demo32H* or an offering from *RandScape* is to hand. These files contain all the information needed to describe the mode, orientation and size of the sprites, and this information is noted by the program.

Once the file is loaded, you are plonked into the main landscape editor. The majority of the screen is taken up by the landscape and the mouse is used to move the large cursor around the screen. You can scroll the landscape simply by holding the Menu button down and moving the mouse.

The bottom section of the editor screen is taken up with a selection of landscape pieces. As there are too many of these to fit on the screen, these pieces can also be scrolled; either by moving the mouse into this area and dragging them with the menu button or by clicking in the far left and far right black bars with the Select or Adjust buttons.

Editing the landscape is easy; the current landscape piece is indicated by a red box on the bottom bar (as shown in our screenshot). Simply click on the landscape with Select to place the chosen piece on the map. Different pieces can be chosen by Selecting them from the bottom bar.

The Adjust button can also be used for placing pieces. By default it will place a blank sprite, but this can be changed by clicking on a piece on the bottom bar with Adjust (indicated by a blue box). Placing sprites in this way can be handy, for example, for placing a row of alternating sprites.

There are only two other keys you need to know; CTRL-S allows you to save your work and CTRL-L lets you load a new landscape.

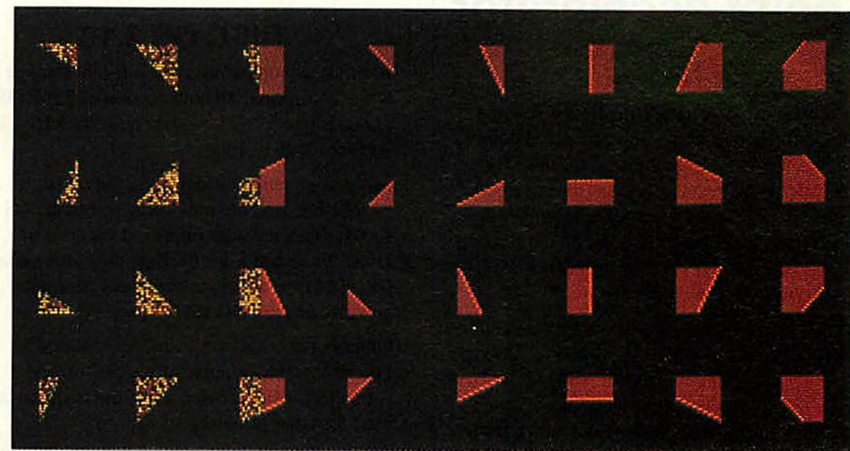
MAPPING IT OUT

If you want to start a map from scratch, I'm afraid you'll have to do so from *Edit* as it didn't seem worth including all the extra code into the editor. The box opposite shows a 'blank' map file. If you type this in and alter it as you require, you can then load it into *EdLand* to create your landscape. The Type: heading is followed by H for a horizontal map or V for a vertical one and either 16 or 32 which describes the size of the sprites. The Files: heading is followed by a list of sprite files to be found in the Scenery directory.

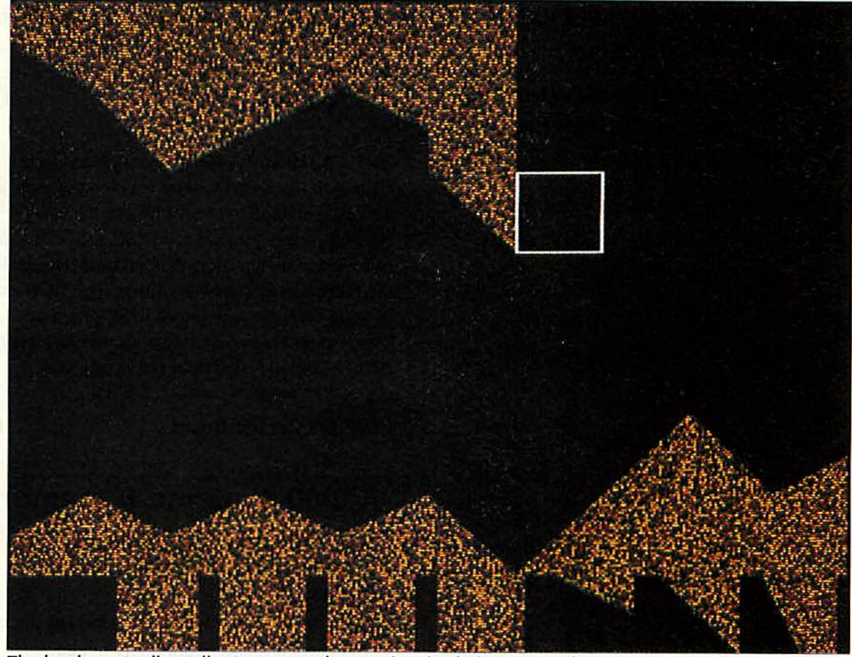
In theory, you can have as many sprite filenames as you want, but be careful not to exceed the current limitation of 255 sprites. The mode used is deduced from the sprite files loaded and, yes, you can confuse the editor by loading files created in different modes. The Used: and Map: headings are filled in by the editor as you create your landscape, so leave this blank for now.

Take a careful look at the sprites generated by *MakeLand* and you'll find there is a good selection of 'corners' and four different solid rocks. This is to prevent patterning appearing in large solid section. Unless you are very careful with your sprite design, you will notice repeating patterns when the same sprite is used over an area; having a small number of identical sprites with different textures will reduce this. Look at *Demo32H* and you'll notice that this happens where a large number of flat pieces of rock are used in a row.

The types of landscape given here are



A bundle of building sprites generated by MakeLand



The landscape editor allows you to place sprites in their correct places

A BLANK MAP FILE

```
; >Maps.Blank
; Mon,09 Nov 1992.17:56:08
Type:V32    (Vertical scrolling
blocks of 32 pixels)
Files: Land32/9    (An appropriate
file of 16 colour blocks)
Used:
Map:
```

restricted, because it is not easy to print all the data needed for some more pretty sprites. You might like to try adding some extra scenery to the sprite files or more appropriately put them in a new file and add its name to the list under the Files: heading in the Map file. If you load this new map file into *EdLand*, you will have access to your new sprites.

If you get annoyed with the default file name always being Default try changing the value of file$ in DEF PROCinit.

THE SCROLLING PROBLEM

One problem that besets many game writers is that of smooth scrolling and we will show you are few different ways to approach the problem here. Let's start out by looking at the short program *BasScape*. This is the most basic example and it manages to scroll in either direction, but not as quickly as the others. The basis for the scrolling is the same for both directions, except that the xs and ys are swapped. The command RECTANGLE FILL . . . TO . . . is used to block copy the section of screen that is going to be scrolled, and then a FOR . . . NEXT loop is used to plot those sprites that are just appearing on the edge of the screen.

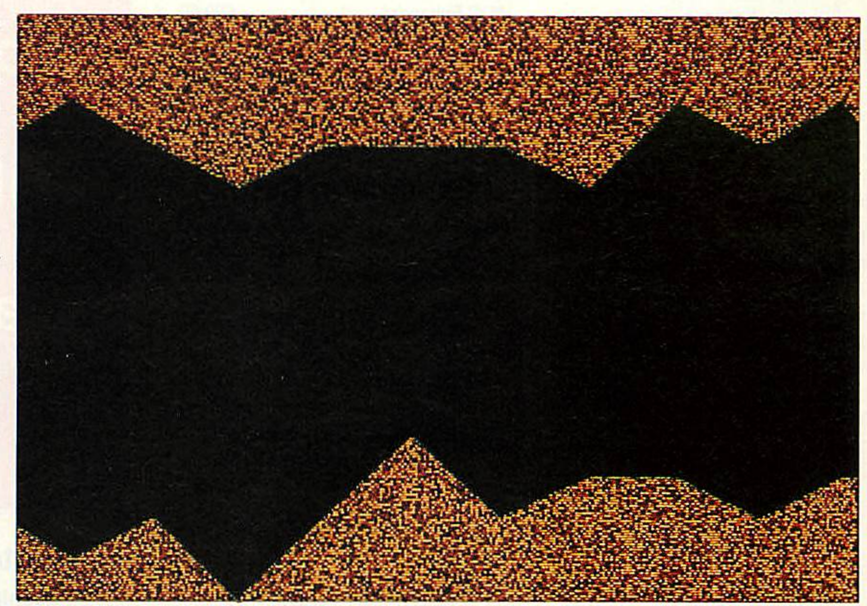
BasScape is a very rough and ready example, but it does illustrate the two main processes behind scrolling the screen, namely moving what is already on the screen up/down/right/left and updating the 'hole' that has therefore appeared with data from the sprites that are about to come into view.

The next step up is *VScape*. Vertical scrolling is the easiest to perform as only whole rows of pixels need to be moved. For the same reason, single-pixel scrolling is also possible in any mode. The pixels are moved in the routine .copy_bank. For flicker-free animation, two screen banks are used. A section of memory the size of the screen is set aside at bank. This contains the current contents of screen. After VSync, the contents of bank are copied to the non-displayed screen and a new pixel line stored in the appropriate place in bank.

The actual data in bank is not scrolled; instead an offset pointer is used to read the data from the correct point. To show you how things are progressing, the border colour is changed to blue while the screen is being copied and green when new data is added to bank. The step to horizontal scrolling is tricky.

Your first move might be to simply 'rotate' the vertical example above. You'd soon run into a number of problems, and out of time, if you attempted it. You can no longer conveniently copy whole wodges of bytes in one go with the Arm code instructions LDMIA and STMIA, as you need to scroll columns rather than rows. And it would simply not be feasible to move 80K of screen 50 times a second by LDRB and STRBing every single byte. You need to be able to copy whole words at the very least. But LDR and STR only work on word boundaries (addresses divisible by four) so some way of working things round is needed.

Listing *HScapeSlow* is our first preliminary solution. It uses four copies of the screen (instead of one in *VScape*) each one one byte 'more scrolled' than the last. If these banks are copied in turn (with LDRs) then the screen will appear to scroll.


The final landscape can be scrolled in any one of four directions

But two problems arise. First, detecting where the 'wraparound' occurs. This was trivial and quick in *VScape*, since it could only ever happen at the end of a row, but it could theoretically happen at any time on a horizontal scroll hence the need to check r7 every time a word is transferred in copy_loop2.

The second problem appears after scrolling. After a one-byte scroll (which is either one or two pixels in mode 13 and 9 respectively) four byte columns have to be updated in a bank.

These columns will not necessarily be on a word boundary and, indeed, may lie in different columns in the map file. So the map data is read in two-word columns coming down the screen, and these are shifted about until a single word can be written to the particular bank that is being updated. Sometimes, of course, no shift is needed, but as we cannot go at more than 50 frames per second, the standard monitor/TV refresh speed, we should only improve the worst cases: speeding up the odd frame is actually a sheer waste of time.

THE FINAL SCROLL

HScapeSlow works quite comfortably on an Arm3, but an Arm2 struggles with even a 16-colour mode. Clearly something has to be done. The most desirable thing to do would be to change our LDRs and STRs into LDMIAs and STMIAs and to remove the need to check for wraparound. But how can we do this without assembling huge chunks of code? The answer is, actually, remarkably simply. If you have a look at *HScapeFast*, you'll see that I actually generate the code needed to copy the screen with the routine at make_route. This generates the appropriate combinations of multiple loads and stores and sticks in a subtract instruction at the right point to handle the wraparound. With these modifications, even an Arm2 can cope with a 256-colour scroll.

Next month I will take you through the intricacies of adding sprite plotting and alien movement to your scrolling landscape.

THE SOFT OPTION

You may be aware of an alternative method to the one used here, which is known as hardware scrolling. It is a technique used widely on the Beeb and other micros.

The Archimedes can handle hardware scrolling but only vertically. Hardware scrolling can be very fast but unless you have additional support for such things as hardware windows, it makes adding any non-scrolling information into the screen rather tricky.

Fortunately the Arm chip is fast enough to accept the extra burden of horizontal software scrolling, so it's all software scrolls from now on. This means we use the power of the processor to move the contents of video Ram around.



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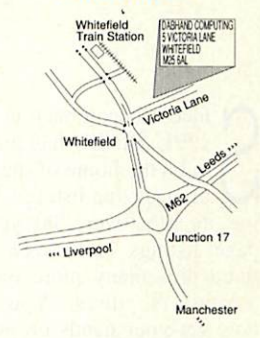
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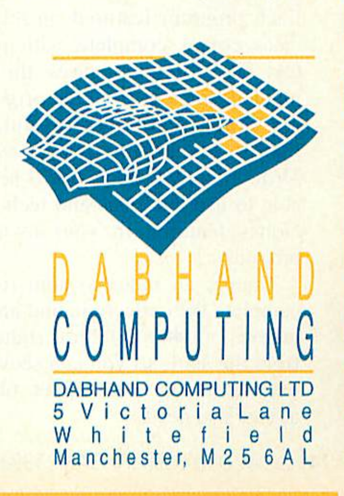


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Since it began back in July 1991, *INFO has proved to be the home of the best in magazine listings. During its life, over 200 yellow page listings have been featured plus many more on the subscribers' discs. You can now get your hands on nearly a megabyte of this high-quality 32-bit software for a mere £7.95 all-inclusive.

Besides the huge range of graphics demos and simulations illustrated here, the two *Best of *INFO* discs contain oodles of advice on every aspect of Acorn machines, and many invaluable utilities.

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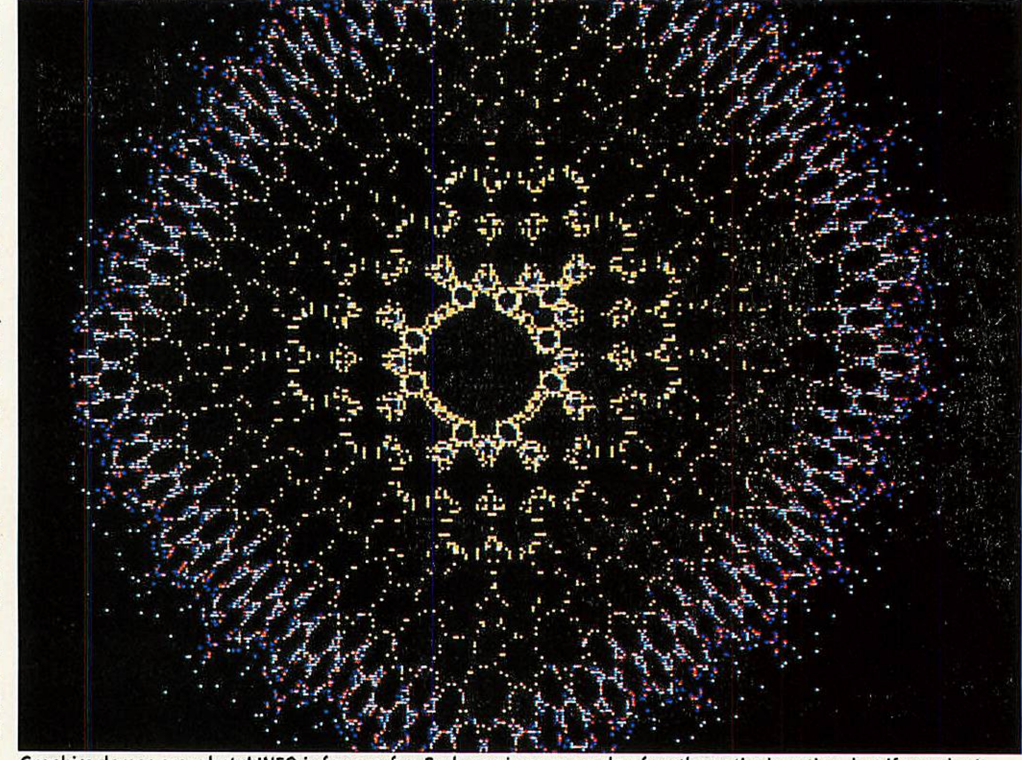
Desktop utilities also feature, like *TidyDesk* – a multi-purpose desktop aid, and *HourMaker* for designing and animating custom hourglasses.

Modules like *Accent* for easy insertion of foreign characters and *ListAid* for paper-saving multi-column listings are also included.

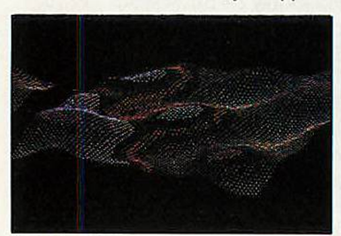
*HELP

Each program featured on the discs comes complete with a text file. In most cases this includes the text from the original article and, where useful, figures are also provided as *Draw* files. We hope you'll be able to use the ideas and techniques featured in your own programs.

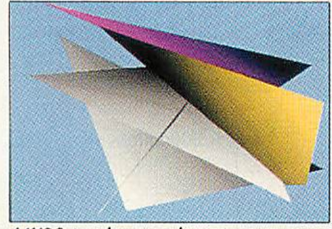
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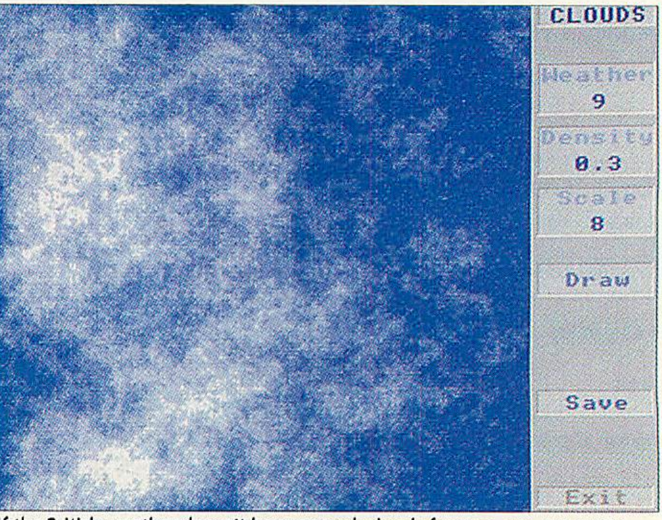
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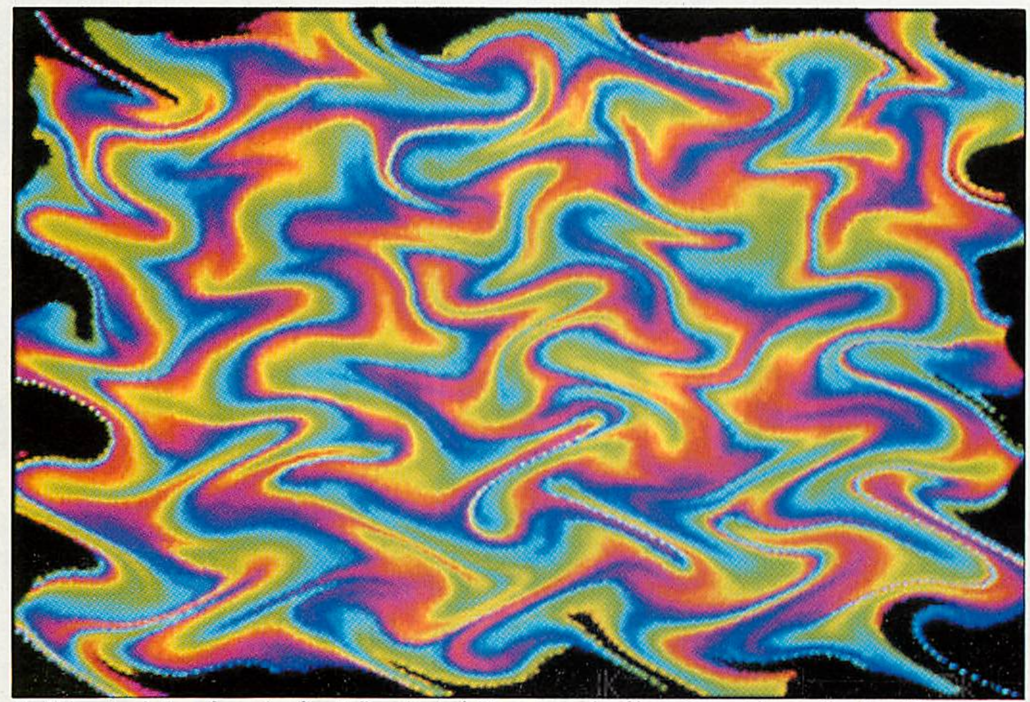
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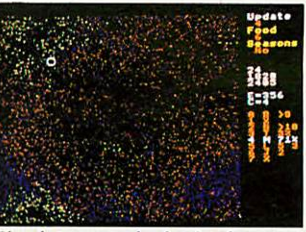
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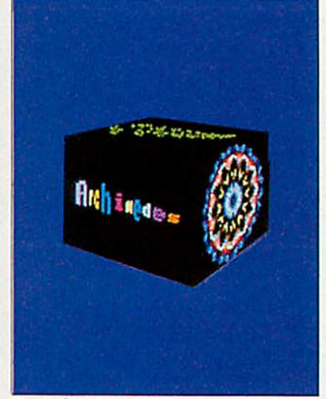
If the British weather doesn't have enough clouds for you, you can create your own, very realistic, on-screen equivalents



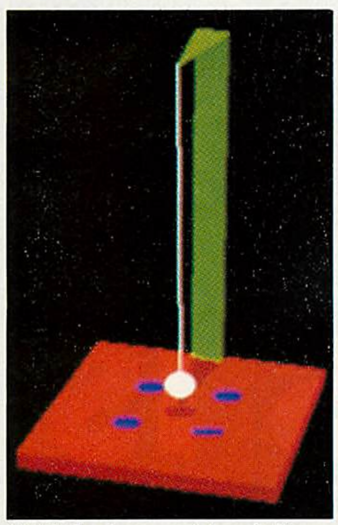
Fire32 is a simulation of a raging fire. Fully animated, it's an example of how to use colour cycling to achieve impressive results



Simulate natural selection by breeding software 'bugs'



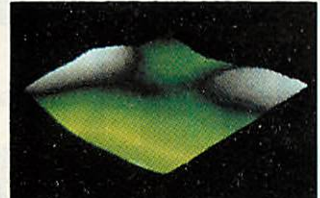
Transform your 2D sprites in three-space with Cube32



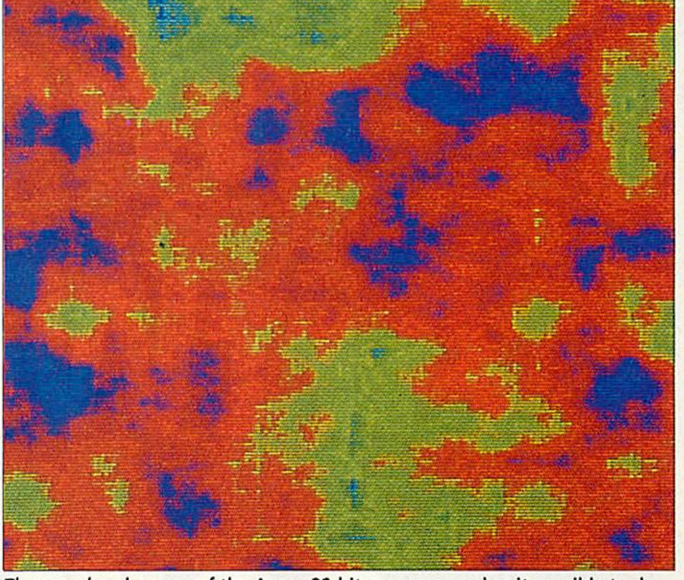
Watch the chaos pendulum do its own swing



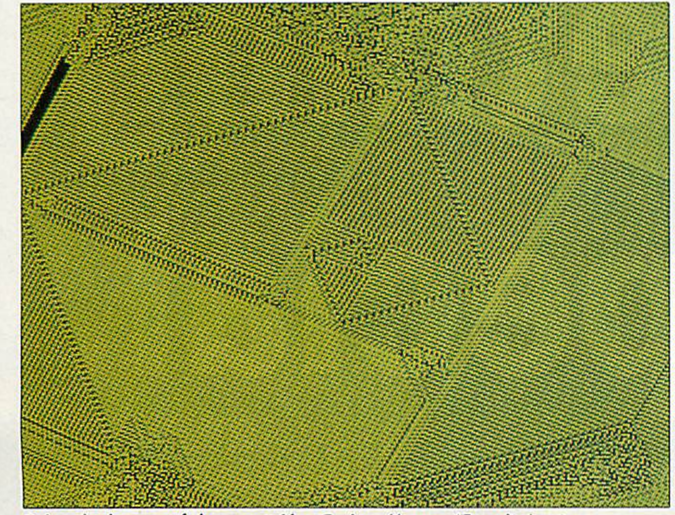
A Pythagorean tree grows to its full height



Glide over a 3D landscape, but watch out for high mountains



The speed and power of the Acorn 32-bit processor makes it possible to do many calculations per second, and makes it possible to write Plasma32



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Acorn Computing November 1992

"In short, it is amazing."

Archive August 1992

"Miss it at your peril."

Acorn Computing Nov 1992

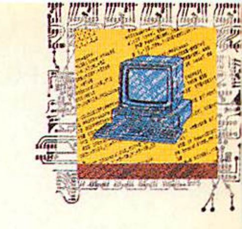
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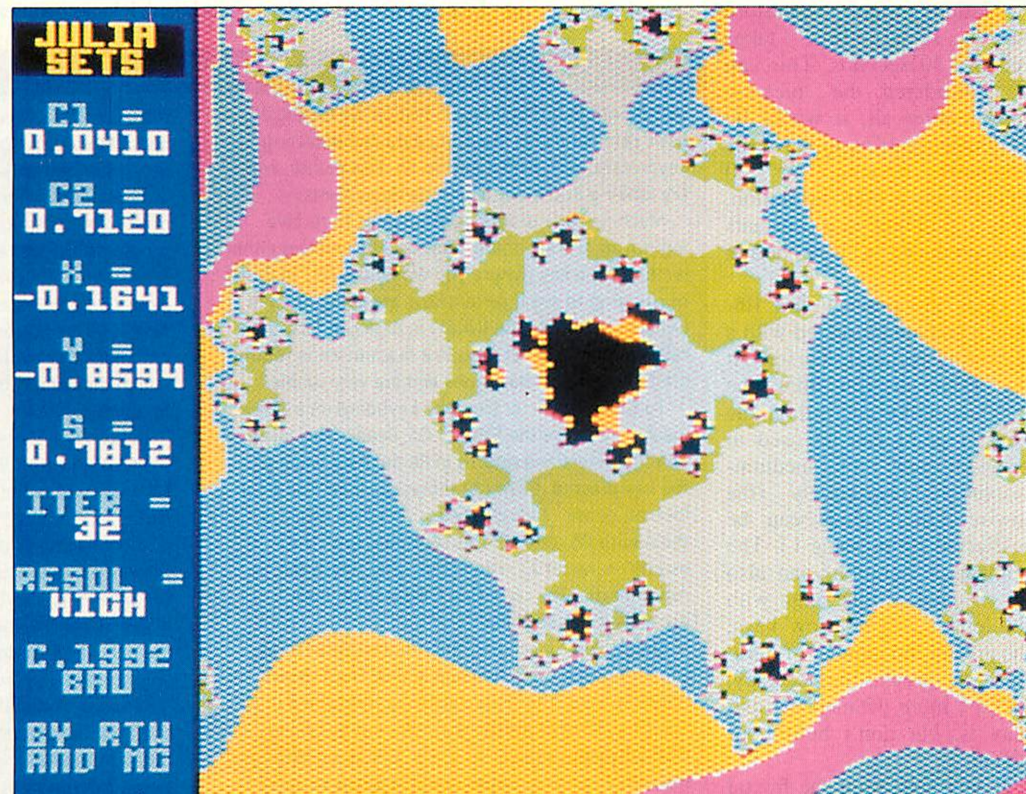
*INFO

Dave Lawrence and Dave Acton present their monthly mix of programs for all Acorn users

STAR PROGRAM

JOIN THE JULIA SET

Programs: Julia8, JulSrc, CharMk
Description: Fractal graphics
Authors: Richard Talbot-Watkins and Matthew Goldbolt
Machine: Eight-bit only
Listings: 180 lines Basic, 40 lines Basic, 440 lines machine-code



The Julia set takes the Beeb to fractal depths it has never explored before

Fast fractal generators are not a new subject in *BAU*; what makes this one special is that it uses machine-code to generate super-quick Julia sets on an eight-bit machine.

The program started life as a fast Mandelbrot generator for the Beeb, to display the set at a higher resolution than the program in the August 1990 issue. Inspired by an Arc Julia set generator, Matthew and Richard set to work on an eight-bit version.

In order to display the Julia set, you must explore the complex domain of z using the formula $z=z^2+c$, where c is a predefined constant. It turns out that it is very similar to the Mandelbrot algorithm:

```
For each point [Px,Py]
Z =scale*Px+x_off
Zi=scale*Py+y_off
iters=-1
REPEAT
 Zi'=2*Z*Zi+c_1
 Z' =Z²-Zi²+c_2
 iters=iters+1
UNTIL Zi+Z>max_mag
OR iters>max_iters
```

A point is then plotted in a colour dependent on the number of iterations processed.

In layman's terms, each point is given a colour depending on the number of times a special calculation could be performed before becoming too big to handle; when it can be said to be tending towards infinity. Variable max_mag is the number which is taken to be infinity; in this case, 4.

Variable max_iters is the maximum number of times calculations will take place on a single point. If this limit is reached, no more calculations take place and the point is coloured black. Constants 1 and 2 are simply two decimal constants in the range -2 to 2, which determine the overall shape of the fractal produced.

From these simple calculations, an extremely intricate pattern is produced which, theoretically, has infinite depth. Not surprisingly, the BBC version cannot claim infinite depth, although it is possible to zoom quite far into the set before the numbers become too small to be handled with any accuracy.

The Archimedes produced a Julia set in under 10 seconds; of course the Beeb cannot even begin to match this, although for the mammoth task it has to undertake, it actually performs very well, taking about five minutes on medium resolution, or 18 minutes on high resolution. Its downfall is the huge amount of multiplication that needs to take place; meaning it works, but slowly. As a point of interest, the multiplying routine originally consisted of a loop, but after 'unrolling' it (and therefore taking out one branch instruction each time round; three clock cycles) the program sped up by two minutes on the most accurate rendering.

In order to use the program, two programs must first be typed in and run, in order to create two datafiles. These are

JulSrc and *CharMk*, which assemble the machine code and create a compressed character set respectively. *JulSr* must be run with PAGE at &3000. The program *Julia8* is the Basic front-end, and can be used to view the fractal.

When run, you are prompted to enter values for constants 1 and 2 (phone numbers are always the best.) Some good examples to try are: (0.2511, 0.5284), which zooms in where the spiral arms meet; (0.0843, 0.672), which zooms in on the 'bullet-holes'; (-1.2, 0.2); and (0.452, 0.401)

The fractal will then be displayed at the very lowest resolution (and therefore fastest speed); this takes roughly 30 seconds. This can be considered the 'preview mode'; after all, it would be very disconcerting to leave the computer running for 20 minutes on a high resolution, only to find that your constants had produced a very boring fractal.

Once the preview has finished, you are presented with a flickering rectangle cursor. At this stage, if you think the preview looks interesting, the keys H or M can be used to provide high- or medium-resolution respectively (the low-resolution mode can be reselected by pressing L). The number of iterations can also be changed at this stage with the left and right arrow keys; the greater the number of iterations, the greater the accuracy, and the more detailed the display is, but don't hold your breath.

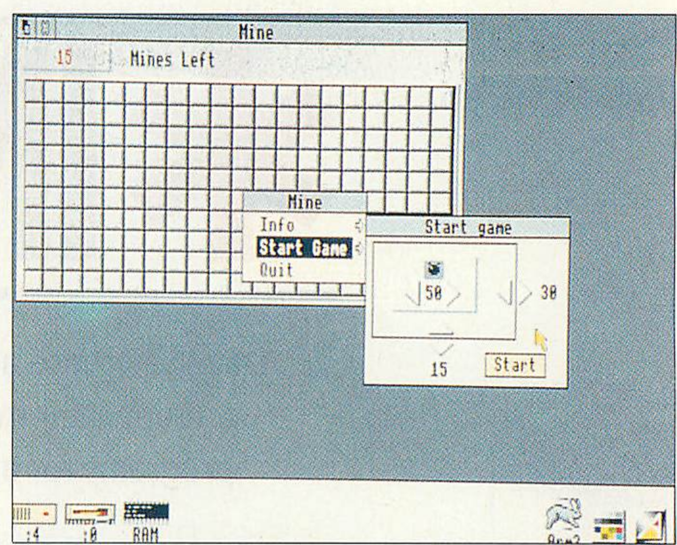
If you now want the fractal to be redrawn using your new settings, just press R. Specific sections of the fractal can be zoomed up and examined in detail, using the rectangle cursor; this can be moved (as normal) with Z,X,: and ?, using SHIFT to accelerate movement. The size of the box – and thus the magnification – can be altered using the up and down arrow keys. When you are satisfied, press RETURN to display the zoomed image.

To enter new values for the constants, just press ESCAPE while the cursor is present. Screens can be saved by pressing S; the filenames always default to *JulPicA*, *JulPicB* and so on during each session; it's therefore advisable to rename precious screens as soon as possible.

MINED BOGGLER

Program: Makemine, Mine8
Description: Single-player thinking game
Authors: D Walters & A Fawcett; eight-bit conversion by DL
Machine: 32-bit desktop version; eight-bit conversion
Listings: 32-bit: 270 + 690 lines Basic, eight-bit: 250 lines Basic

In the words of David Walters, this is a version of the best feature of Windows 3.1; which is, of course, the free game.



A nice clean game board; it looks harmless enough . . .

BEGINNERS' BIT

Last month in our beginners' section we looked at Basic commands for inputting data and detecting keypresses; GET, INKEY and so on. This month, we are looking at the machine-code equivalents.

Machine-code programs often need to receive input from the keyboard. This usually involves either waiting for a key (where you would use GET in Basic) or checking to see if certain keys are being pressed (where you would use INKEY; in Basic). In fact, the calls you use to check keys in a machine-code routine are the same that Basic uses and are very simple.

To GET a character from the keyboard on a 32-bit machine you use the SYS call OS_ReadC. This takes no parameters and returns in R0 the Ascii value of the key pressed. *GETmc32* shows the idea. The small loop at .getmc reads characters and then displays them with OS_WriteC. This continues until the escape character 27 is detected, after which the routine exits. The carry flag C is set if an 'error' occurs, such as ESCAPE.

On eight-bit machines, the routine OSRDCH (at &FFE0) has the same function and *GETmc8* shows how it is used. The character typed is returned in A. The small loop prints the character out by calling OSWRCH – the equivalent of OS_WriteC on 32-bit machines – and continues until ESCAPE is pressed. C is set if ESCAPE or another error occurs.

More complex input routines can be built up using OSRDCH or OS_ReadC. It is up to you to write an input routine to suit the sort of data being entered. There are calls provided to input a stream of characters. On eight-bit machines OSWORD 0 can be used; *INPUTmc8* shows its use. OSWORD is called with A=0 and X,Y pointing to a block. This contains the address and size of the buffer, and minimum and maximum allowable Ascii codes. Characters outside the allowable range are still displayed; they are just not entered into the buffer.

Users of 32-bit machines should use the call OS_ReadLine to get a line of text and *INPUTmc32* demonstrates the SWI. R0 points to the buffer, R1 is the maximum length, R2 and R3 are the lowest and highest allowable values. Risc OS provides many calls to assist the processing of data entered. For example, there are calls to convert strings to numbers. These we will no doubt cover in a future Beginners' Bit. Eight-bit users have to do most of the work themselves, so it is often best to do the fiddly things (like parameter checking) in Basic and use machine-code only when speed is of the essence.

Checking whether or not certain keys are being pressed is a common feature of many machine-code programs. Games rely on quick key detection. Last month we saw how INKEY could be used with either a positive parameter or a negative one. In the first case, a GET is performed but with a time limit. But with a negative value, INKEY will check only whether one particular key is being held down and is therefore very quick.

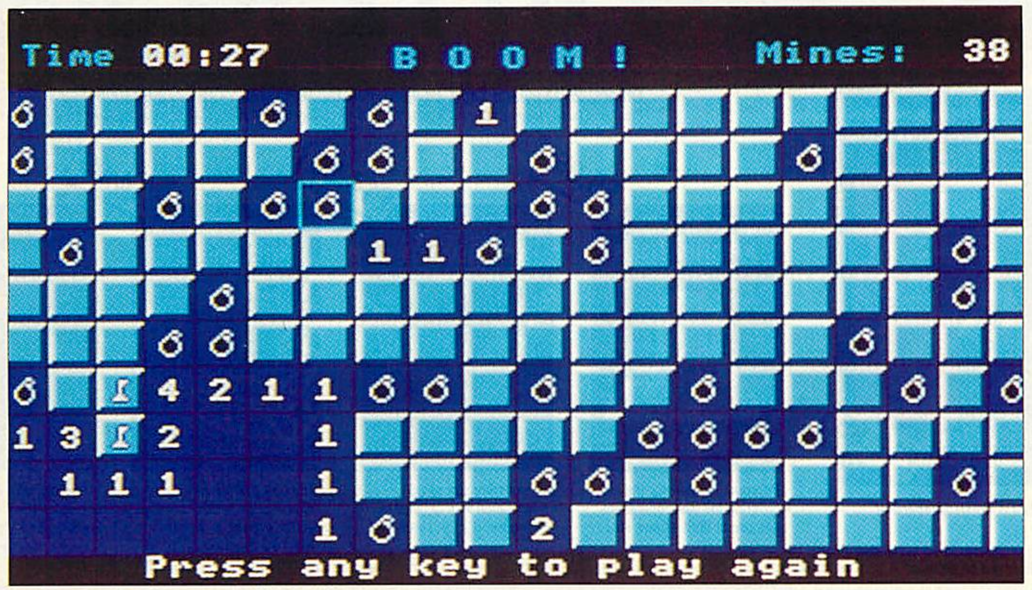
In both cases, the INKEY command actually uses the OSBYTE call 129. *INKEYmc8* and *INKEYmc32* wait for a key with a time delay. On eight-bit machines, A=129, and X and Y contain the low and high bytes of the delay (in centiseconds). If on exit Y=0, X holds the key pressed. Y=&FF means no key was pressed in the time limit. Y=&1B if ESCAPE was pressed. The 32-bit call is exactly analogous. On entry, R0=129 and the delay is in R1 and R2. On exit, R2=&FF if no key was pressed. If R2=0, R1 contains the key.

If R2 (or Y) contains &FF on entry, key R1 (or X) is checked. The correct INKEY- values for keys can be found in the *Advanced User Guide* or PRMs. Alternatively, run the short program *INKEY-*. This will display the INKEY- values for any keys pressed. The first (negative) number is as would be used in a Basic INKEY command. The second is 256 plus this value and is what would be loaded into R1 (or X) prior to an OSBYTE call. After calling OSBYTE R1 and R2 (X and Y) contain &FF if the key is being pressed.

As an example. *Bat32* and *Bat8* show a simple game bat, moved left and right with Z and X. The code for eight and 32-bit machines is very similar. In *Bat32* the bat position is held in R4, whereas it is stored at batpos in the eight-bit version.

The Bat programs also show how to detect that special key; ESCAPE. 32-bit users have a SWI call, OS_ReadEscapeState, that returns with carry set if ESCAPE has been pressed. Eight-bit users will find the easiest way to check for ESCAPE is to look at the top bit of location &FF. It is set when ESCAPE been hit, so use the following:

```
BIT &FF
BMI escape_pressed
BPL carry_on
```



... but certain things are lurking under cover

David has supplied us with a fully Risc OS compliant application and I have spent the last day or so beavering away to produce the eight-bit version. The idea of the game is very simple; uncover all the safe squares on the grid and place a flag over each one of the suspected mines.

You have as many flags as there are mines and the game is over when you have used all your flags (or have stepped on a mine). The actual positions of the mines will only be revealed if you successfully locate them all or, *in absentia*, if you have a little accident . . .

Clicking on a square with Select, or pressing SPACE in the eight-bit version, will 'uncover' a square. If it's a mine you're dead; if not, a number is placed in the square telling you how many of the eight adjoining squares contain mines. All adjacent non-mined squares will also be uncovered, as will their neighbours and so on. Clicking in the centre of a clear area will therefore reveal the extent of the safe patch.

Clicking with Adjust (RETURN on eight-bit) places flags. One click changes to a flag, a second to a '?'(if you're not so sure), a further click changes it back to uncovered. Flagging a square is only for your benefit; you won't know if you're right until the end. The three keys F, M and C can be used on the eight-bit version to place a Flag, a Maybe or RETURN to Clear.

Both versions allow you to alter the size of the field and the number of mines. The 32-bit version uses a menu option, and in the eight-bit version you edit the numbers at the top of the screen with the cursor keys. SPACE or RETURN starts a new game.

There are two listings for 32-bit users. First create a directory called Mine and enter and save RunImage within it. Next, enter and run *MakeMine* in Mine – this will create all the other files required. Double-click on Mine to play. For the inquisitive, *Mine8* is the subject of this month's IN DETAIL box.

MAZE CHALLENGE RESULTS

We had an excellent response to our Maze challenge (September 1992). To put you all out of your misery, the top ten maze solvers are given in the box below. John Atkinson of Blandford Forum in Dorset won the £25 prize. Congratulations to him and the other nine shown, and a big thank you to all who entered and made the standard so high.

The challenge was to write a set of procedures to solve ten unseen mazes, produced using the randomly chosen seed; 8507. John's winning entry managed to solve the ten random mazes in just 1352 moves. Sam Lindley came a good second with 1570 moves.

All but one of the entries tackled all ten mazes successfully. Authors wrote their entries on a variety of machines; some eight-bit, some 32-bit. André Moerenhout of the Netherlands wrote his on a PC using PC BBCBASIC(86) and the winner, John Atkinson, used his Master 128 with Cambridge co-processor (running bas32f).

Many entrants said they felt a total of ten mazes wasn't enough to do their programs justice and, on reflection, we would have to agree. Our original choice of ten was based on a maximum allowable solution time of 20 minutes per maze. To test 100 mazes could therefore have taken up to 33 hours and, when multiplied by the number of entrants, easily outstretched the number of machine-hours available.

Still, a knockout system might have been fairer; testing all on 30 mazes, eliminating half, testing the rest on 60, eliminating some more and so on until a clear winner is found. We'll bear all your comments in mind for next month's challenge.

To give some of the runners up a chance to show off their solutions, we tested the top ten on 100 mazes and the results are also shown in figure 1. As you can see, most of the top ten managed all 100 in less than 19,000 moves and several in less than 17,000. By way of acknowledgement, we are awarding special prizes of £5 each to Mike Cumpstey, Jeffrey Almeida and David Radford.

On the yellow pages you will find John Atkinson's solution together with Mike Cumpstey's routines. Jeffrey Almeida and David Radford both produced rather long sets of procedures – including machine-code – but we have put them on this month's disc for those who are interested.

Also in the yellow pages is *BAU*, our own attempt at the problem which we wrote while testing the original competition program. Incidentally, although we normally edit programs to bring them into 'style', we have left all Maze routines in their original form so that you can see the variety of approaches different programmers adopt when tackling the same problem.

- **First Prize (£25):** John Atkinson. Like many solutions, John's works in two parts. We know the amulet is hidden on the edge of the maze and our man starts in the middle. The strategy is to therefore (a) find the edge and then (b) tour the edge. As with all the better entries, known dead ends are ignored.
- **Special Prize (£5):** Mike Cumpstey. We know very little about how Mike's entry works – only that it works very well and solved 100 mazes in the fewest moves.
- **Special Prize (£5):** Jeffrey Almeida. Jeffrey came ninth in the competition proper but his routines solved 100 mazes in only 16,382 moves. The program rates squares as 'useful' or otherwise. If there are no useful squares in the man's immediate vicinity, the useful square reachable in the fewest moves is found and the man is directed towards it.
- **Special Prize (£5):** David Radford. David's routines eliminate known dead ends by 'walling them off'. He tells us a sort of 'flood fill' is used to mark off more complicated dead ends. As with Jeffrey Almeida's solution, a pathfind-

TOP TEN MAZES

MAZES:	10	100
1 John Atkinson	1,352	18,628
2 Sam Lindley	1,570	18,242
3 Chris Saunders	1,708	19,550
4 Colin Granville	1,736	21,244
5 Gareth Moore	1,766	16,862
6 Phillip Rogers	1,782	20,340
7 David Marples	1,808	17,450
8 Mike Cumpstey	1,816	16,176
9 Jeffrey Almeida	1,824	16,382
10 David Radford	1,914	16,239

ing routine is employed to take the man by the quickest route to the nearest square that may lead to the edge.

● **Our solution:** *BAU*'s solution performed reasonably well over 100 mazes and – by some fluke – was beaten only by John Atkinson's over the 10 that count. We include it as an example of an 'empirical' approach to the problem. At each stage, a recursive procedure PROCcount is called to weight each of the possible exits to the square according to how quickly they are likely to lead to the edge. If none are promising, you must be up a dead end, so your steps are retraced. The value 1.4 at line 470 was found by trial and error.

PEARLS OF WISDOM

Programs: Pearls, Pearls2
Description: Graphic demos
Author: Jan Vibe
Machine: 32-bit
Listings: 90, 100 lines Basic

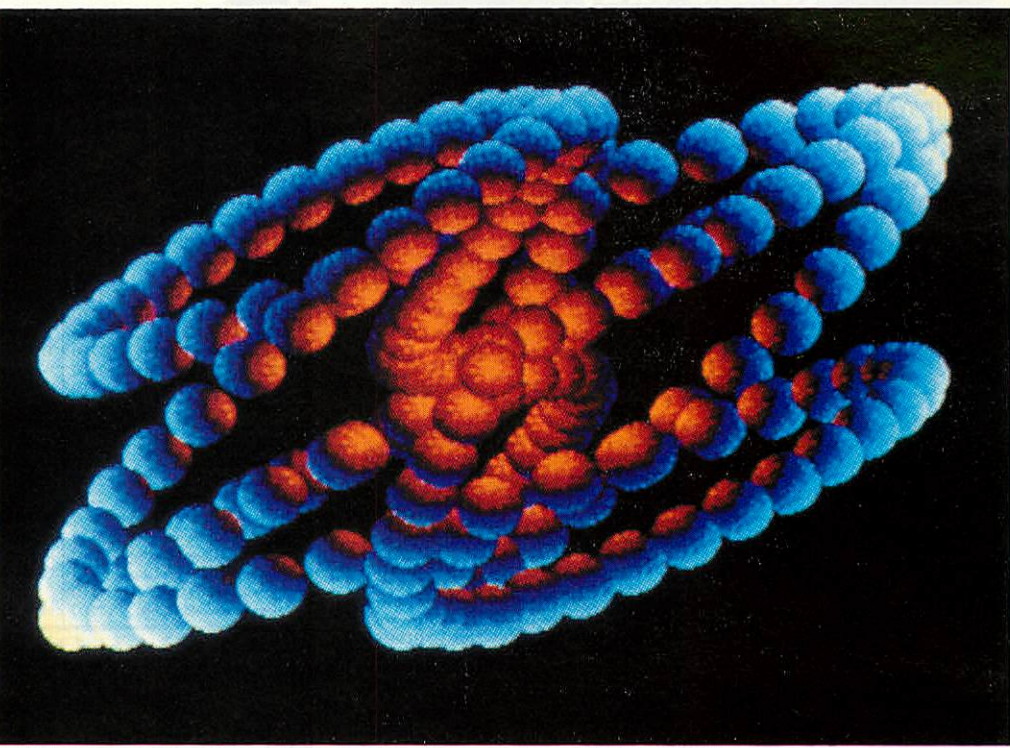
Two graphic quickies now from *INFO regular Jan Vibe. They both use the shaded ball that Jan introduced last month.

Pearls creates a ball and cycles the colours to produce a dramatic effect. *Pearls2* uses a fixed colour ball but employs several screen banks for its animation.

TWIST AND SHAPE

Program: Parallel, Twist
Description: Sprite demo
Author: DL
Machine: 32-bit, Risc OS 3
Listings: 50, 100 lines Basic

One of the many areas to be enhanced in Risc OS in its latest incarnation is sprite plotting. It is now possible to transform sprites as they are plotted. A new OS_SpriteOp (number 38) allows you to supply either a transformation matrix (in a similar way to drawfile transformations) or a destination parallelogram. According to the PRMs, it may be possible to supply an arbitrary quadrilateral in some future release, but current versions are limited to linear transformations. The output from this call will cover exactly the same area on screen as a call to Draw_Fill would given the same matrix.



Jan Vibe's program goes for relatively simple curves: a case of Pearls before spline?

IN DETAIL

This month we take the lid off *Mine8*, examine it and delve around. Inside we find some rather unusual 'sprites', recursion, boolean algrebra and a few ideas on saving memory.

The first area of technical interest is the way that the program draws the various 'tiles' that make up the game board. Covered – meaning non-touched – squares are represented with a raised bevelled-type effect, complete with a flag or a question mark as appropriate. Uncovered squares appear as either plain blue or they come equipped with a number between 1 and 8.

It would be normal, in a game like this, to store these graphics as bit image sprites somewhere in memory and have a simple piece of machine code to plot them on the screen. *Mine8* neatly sidesteps this set-up for simplicity's sake and, instead, stores the VDU sequences necessary to draw the various tiles in string variables. flat$ and tile$ are initialised in lines 360 and 370 by means of FNread and the small collection of DATA statements at the end of the program.

The process of PRINTing these strings will display, at the graphics cursor, a blue or a bevelled tile respectively. The numbers, flags or question marks are added afterwards in a similar manner. Have a look at lines 380-440 and PROCtile at line 720. A number of functions (gcol, plot, w and b) have been defined to make this initialisation as plain as possible.

The board is stored in memory as a byte array called w. It is defined in line 310 to be two elements bigger in each direction. This allows space for a 'no man's land' border around the outside of the actual play area.

This saves an awful lot of checking in various routines for falling off the board into hyperspace. The minefield is set up in PROCblank. First the play area is cleared and then random positions are chosen for all the mines. As each mine is placed the surrounding eight squares are incremented by one to reflect the number of adjacent mines. Notice that no boundary checking is needed for this because of the screen border.

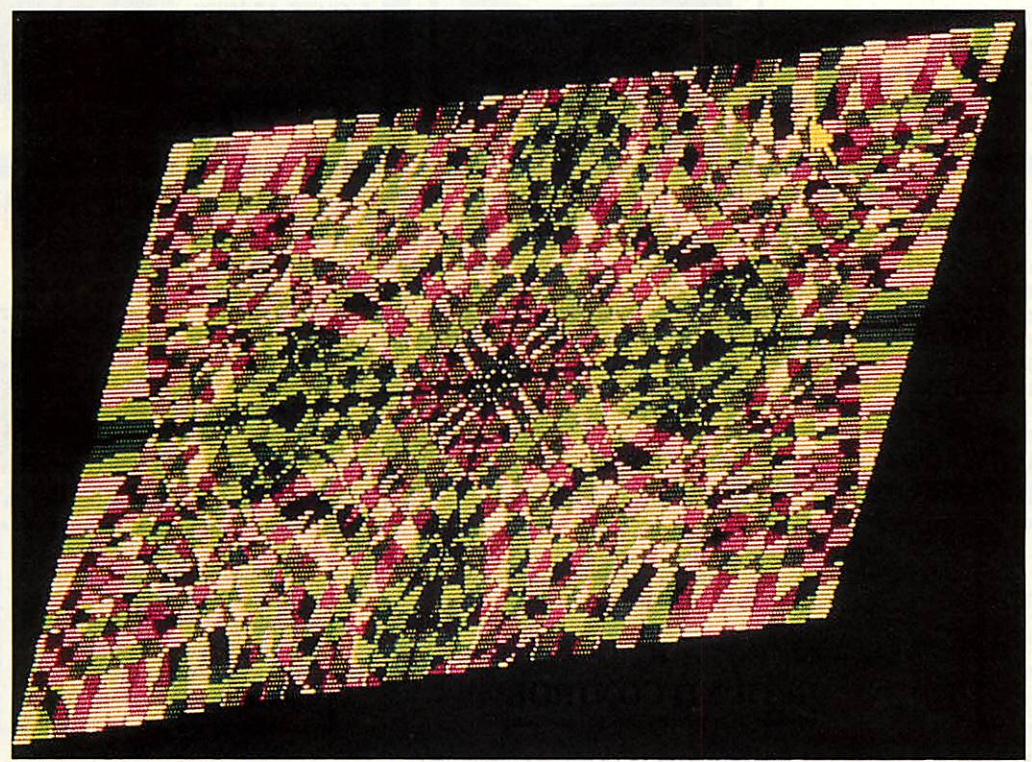
The uncovering of squares is performed by the recursive procedure PROCtread. This examines the square and if it has already been trodden on (line 1770) nothing happens. Otherwise t will contain 0 (for clear), 1-8 (meaning that many surrounding mines) or the 'magic' number 9 (meaning a mine has been hit).

If this is the case the player is dead and this is flagged (line 1780). Line 1790 reveals the contents of the square to the player and also marks the square as trodden on. If the square was totally clear then the recursion kicks in and calls PROCtread for all surrounding squares.

Boolean algebra crops up twice in PROCmark to shorten some of the lines. In line 1910, the value of marks (the number of flags the player has left) is decremented if a flag is placed (the +(m=flag)) and incremented if a flag is removed (the -(s=flag)).

Variable s is the old 'flag status' of the square and m is the new one. Line 1920 keeps track of the number of bombs discovered so far (this figure is never revealed to the player though). Here t is contents of the square, thus left is decreased if a mine is present and a flag is placed and increased, if one is removed.

The final points worth noting are the two measures taken to increase the available memory. First, PAGE is lowed in line 80 and, second, nine lines are 'stolen' from the screen (lines 240-290) which frees over 5½K. Program lines 260 and 270 move the start of screen address and line 280 blanks off the reclaimed memory so that the screen isn't cluttered up with rubbish.



Doing overtime: as if being plotted wasn't enough, your average sprite can now be simultaneously transformed

TIPS OF THE MONTH

Alan Hodson has reminded us that you can avoid having to wait endlessly for your printer to finish its business by using the 'print to file' option of the printer driver.

As an example, consider printing an *Impression* document or similar. First bring up the menu over your printer driver (*PrinterDM* or other) and go to the File submenu. Enter a suitable filename (either on a hard disc, like ADFS::4.$.temp or on the Ram disc) and press RETURN.

Now print your document as usual. Nothing will be sent to the printer – output will be redirected to the file. You will need to ensure there is sufficient space on your disc (or on the Ram disc). This will clearly depend on the size of your document. You might like to use a temporary file on a compressed filing system like *ArcFS* or *Compression*. Printout files invariably compress very well indeed.

To print, select Parallel from the printer drive menu. Now drag the temporary print file and drop it on the printer driver icon. Printing now takes place entirely in the background.

Alan says this process typically reduces the printing time for an A4 text and graphics file from 10 to 12 minutes to under two.

Mr P Wootton of Droitwich has pointed out an interesting feature of Risc OS 3. Windows can be 'iconised' if they are closed while holding down SHIFT. They appear as small sprites on the pinboard and can be reopened by double-clicking.

Protocols exist to give applications the chance to use special sprites for iconised windows and Mr Wootton has discovered a simple way of customising them. When a window of a task is iconised the sprite "IC_TaskName" is used if available. Spaces are not allowed in sprite names, so the name up to the space is used. There is a limit of 12 characters to a sprite name, so truncate these necessary. Some examples:

Task name	Sprite
Task Manager	IC_Task
Impression	IC_Impressio
FormEd	IC_FormEd
PCEm	IC_PCEm

Design your own sprites with the appropriate names and the correct size (34 wide and 17 high in mode 12, 34 high in mode 23 or 27) and install them with **IconSprites*. Mr Wootton has supplied an example file that we'll put on the monthly disc.

There are two listings on the yellow pages that demonstrate this new call. *Parallel* draws a pattern in the bottom left-hand corner of the screen and then lets you drag the top right-hand corner around. The other two corners follow, always forming a parallelogram.

A quick glance at the listing shows that lines 230-280 do the actual work. The memory at dest is filled with the coordinates of the desired transformation and line 280 uses these to plot the sprite. Bit 0 of R3 says whether R6 points to a destination block (1, as here) or a transformation matrix. We will see this form of the call a little later. If bit 1 is set, then R4 can point to a block of four words containing the source area within the sprite, thus allowing you to transform just a section of the whole. This feature is not used here. R5 contains the GCOL action, +8 to use a mask as with normal sprite plotting.

The second listing, *Twist*, uses the matrix form of this call. It rotates circular areas of the screen, which is quite an amazing thing to be able to do for such a short routine. If run from the desktop, the desktop screen is used, otherwise a set of animated circles is drawn. Sets of concentric circles are then cut out and repeatedly rotated and replotted, producing a twisting effect. If you hold down SHIFT only one rotation is performed giving more of a twitchy display. In the non-desktop version, holding SPACE stops the plotting, but keeps the animation going.

PROCturn does all the work here. Line 740 cuts out a sprite from the screen. Line 750 makes a mask for it. Then the REPEAT loop is entered. For each radius, a circular mask is created by switching screen output to the sprite mask (line 800) and simply plotting a circle. Line 840 restores normal screen output. Lines 850 to 900 set up the transformation matrix:

x'=x*mat0+y*mat8+mat16
y'=x*mat4+y*mat12+mat20

. . . where mat16 and mat20 are simply screen offsets but must be in 'draw units' which are 1/256th of a pixel point, hence the <<8 on the end of the line. These also contain rotational transformations to calculate where to plot the sprite so that its centre stays in the same place on the screen after it has been rotated. Line 910 actually plots the rotated sprite, which needs its mask to make it circular, so R5 is set to 8.

For your reference, OS_SpriteOp 37 is the complement to this call and plots a sprite mask transformed.

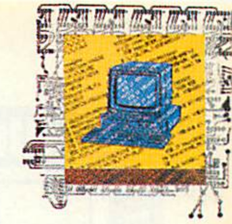
*DEBUG

A bug slipped in last month's *IFS2* program means it doesn't function correctly under DFS. This has now been fixed and new versions of three routines (PROCfindidfs, FNnextname and PROCbbg_gbpb) are on the yellow pages. A full copy of the program is on the *BAU* monthly disc.

*QUIT

Listings, applications, hints, tips and requests are all welcome. All but the shortest listings should be on disc with a description. *Please* write your name and address on your disc. A stamped, self-addressed envelope will ensure the return of the disc.

Send your submissions to: *INFO, BBC Acorn User, Redwood Publishing, 101 Bayham Street, Camden Town, London NW1 0AG.



A STITCH IN REAL TIME

Dave Acton picks up his needles and reknits the BAU garment design program into 32-bit form

Not one to pass over a challenge, when *BAU* suggested I update the eight-bit knitting program *KnitOne* (*BAU* December 1989) for 32-bit machines, I rashly agreed, in spite of knowing nothing whatsoever about the subject.

After some hasty knitting lessons from my mother-in-law Delma – who is more than a little bit nifty with the number fours – I set about rewriting Joan Barnard's original listing and contemplating the possibilities the Archimedes offered the knitter.

Joan's original program served two purposes. First, it took a saved BBC screen and converted it into a printout resembling a knitting pattern. Second, it took the work out of stitch-counting by printing a row-by-row account of how many stitches there were in each colour. *KnitTwo* offers the same facilities to 32-bit users who want to produce 'Fairisle' or other knitting patterns in several colours. Before looking at the program though, consider the time-consuming alternatives . . .

The time-honoured way of designing patterns is to use graph paper, often many sheets of it. Each square represents a stitch on the finished garment. Graph paper has many disadvantages. Mistakes can only be corrected with much rubbing out, and inserting rows or stitches is impossible without redrawing. Your computer comes to the rescue though. Even the simple sprite editor, *Paint*, that comes free with your Arc is a powerful tool for designing garments.

KnitTwo takes a design in the form of a sprite, created with *Paint* or similar, and produces two other files from it. The first is a *Draw* file, and this contains a pattern ready to be printed out. Each coloured stitch in the original design is replaced by a symbol, and a key and row numbers are added to make the pattern complete. A 24-pin dot-matrix printer is quite suitable for printing out all but the most complicated designs. Use *Draw* or *Impression* to scale the pattern to best fill the page.

KnitTwo also outputs a text file and this produces a row-by-row count of how many stitches there are in each colour.

For conciseness, the finished program is not a multitasking application, although it is designed to run from the desktop. Since you are going to be spending most time using *Paint* to work on your designs and will only use *KnitTwo* to produce the final pattern, So the extra typing-in would not be justified.

WHAT TO DO

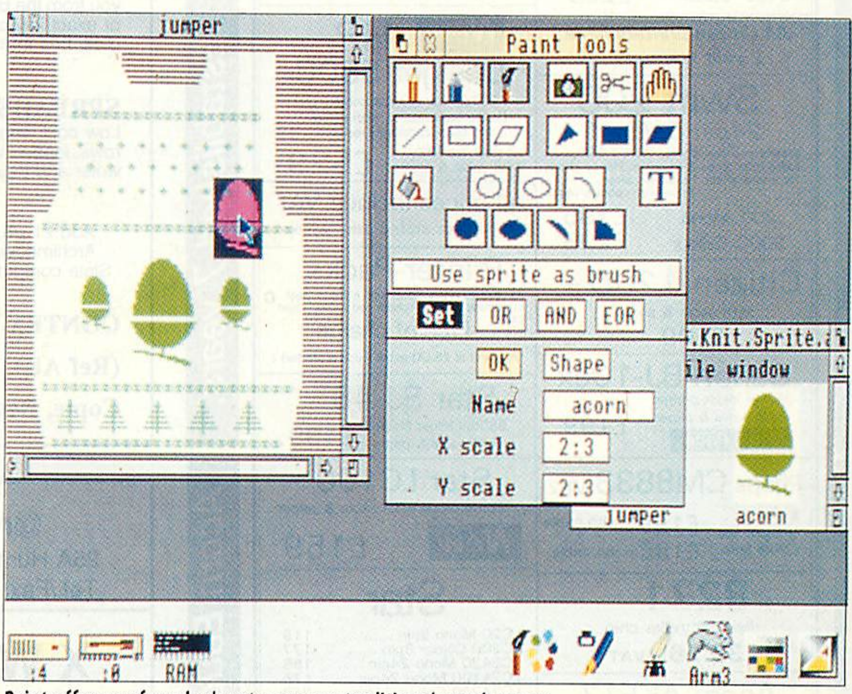
There are three listings to enter, but first you must create a suitable directory structure. First create a directory called Knit. In this will live not only the program, but your designs and the finished patterns and row counts. Go into Knit and create four more subdirectories, as follows:

!Knit: this will contain the program itself and other relevant files. When ready, double-click on !Knit to use.

Sprite: this will contain all your designs ready for conversion to patterns.

Draw: this is where all patterns produced by *KnitTwo* will be placed.

Text: Finally, this is where the row-by-row stitch counts will be stored as textfiles.



Paint offers profound advantages over traditional graph paper

PAINT v PAPER

Using *Paint* offers many advantages over graph paper . . .

- Mistakes can be corrected quickly and without mess.
- Areas of the pattern can be moved, and rows & stitches inserted where needed. This simply can't be done on graph paper.
- Colour can be used to give a good idea of how the finished work will look. The 256-colour screen modes are ideal.
- You can build up a library of designs. Careful use of directories and subdirectories will allow you to store all your finished and half-finished patterns, as well as motifs, band designs, and anything else you fancy.
- You can also design a sprite to represent the whole garment. For one style of jumper, create a blank version and save. Then add whatever designs you like and compare them on-screen.

Having created these subdirectories, enter *KnitTwo* and save inside !Knit. Now enter KnitFiles and run this inside !Knit. Several files will be created, including a subdirectory Symbols which contains all the pattern symbols as simple drawfiles.

Now enter *KnitDem* and run it inside the directory Sprite. A demonstration sprite file called *Demo* will be created. Double-click on !Knit and, when prompted, enter the filename, *Demo*. After a while, you will be asked to name the colours used in the sprite file. By default, they are called A, B, C and so on, but you may wish to change them to full names or abbreviations; whatever you would like to appear on the pattern and row counts.

Soon the pattern and row count files will be created. Both of these will also have the name *Demo* and they will be found in *Draw* and *Text* respectively. Use *Draw* or *Edit* to view them, print them out or whatever. Any sprite file can be used as the basis of a knitting pattern. Simply copy it into Knit.Sprite and run the program. If there is more than one sprite in a given sprite file, *KnitTwo* will assume that you want to use the first one.

I thought it would be simplest for a single pixel to represent a stitch. Therefore, to begin a

design, simply create a sprite that is suitably wide and high to accommodate your design. The mode of your sprite should be one with square pixels. The easiest mode to use is mode 13; a 256 colour mode. You will need to use mode 13 or 15 in the desktop to get the full effect. If you choose to use a 16-colour sprite, remember to create a palette for it, so *KnitTwo* knows what colours you are using.

Having created your sprite, add a mask. This is not necessary if you are just designing a square motif, but otherwise use the mask colour to 'cut out' the shape of your design as in the example.

ALTERATIONS

The finished *Draw* file patterns consist of a symbol for each pixel in the original design with a grid superimposed on the top. The font used in the key and for the row counts is defined in PROCinit_font. To use another simply alter font$ and fsize% (the size in points). Currently, eight-point Trinity Bold is used.

You might also like to alter the size of a cell on the pattern. This is determined by cell_size% which is currently set to 2400 in PROCinit. Choosing a larger size will make for a more readable pattern and is a good idea if you are just designing small motifs, or smaller garments like gloves. The size of 2400 was chosen. so the demonstration pattern would fit comfortably on an A4 sheet.

Currently, you are limited to eight colours although, if you are a fiendish knitter and would like to use more, you could easily extend the program. The symbols used can be found in the Symbols subdirectory in *!Knit*. They are just drawfiles and you can change them as you like. You will see they are numbers 0 to 7. When you run KnitTwo the given design is checked and a count is made of how many pixels of each colour are used. Symbol 0 is used for the most common colour (this is by default a blank square). Symbol 1 represents the second most common and so on. Two points should be noted if adapting the symbol files.

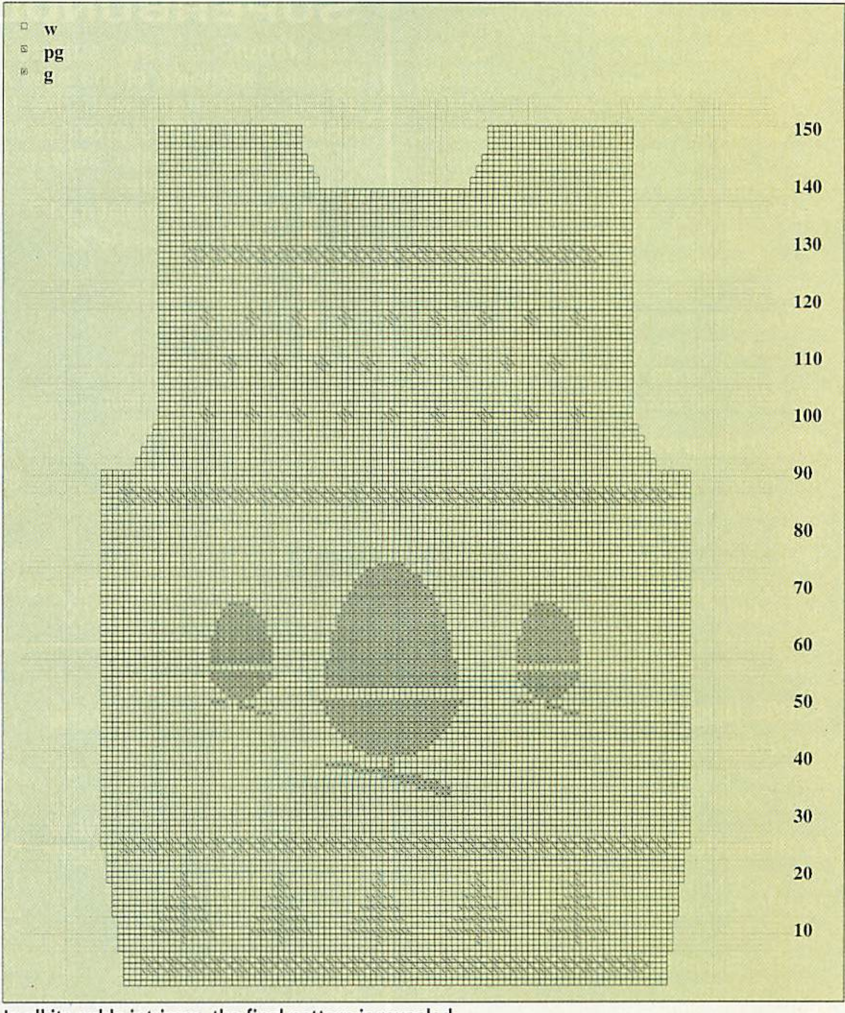
First, only simple paths are used so don't go adding text or other complications or *KnitTwo* will throw a wobbly. Second, the *Draw* files are roughly numbered in order of decreasing size, so the smallest draw objects are used for the most common colours. This keeps the final pattern small. With the same aim in mind, most of the symbols are of similar style using the same colours and path widths. This allows *KnitTwo* to join similar objects where possible and keep the patterns smaller still. Do remember to bear these points in mind when fiddling with the symbols.

TRICKY BITS

Rows which contain 'gaps' are currently ignored by the stitch-counter. The message 'consult pattern' appears in the text files. This is because the program cannot easily provide intelligent instructions for how to deal with such problematical areas (typically the neck of a sweater). Since most such areas will be unpatterned, the usefulness of the program over the main patterned area shouldn't really be diminished.

The first row is examined right-to-left (meaning right side facing). You may wish it to start at the other side, in which case simply change the dir%=-1 at line 4400 to dir%=1. If you want the option of starting at either side, add a suitable INPUT statement.

I am the first to admit to being only a novice knitter and, although *KnitTwo* serves as an adequate update to Joan Barnard's original, I would be delighted to hear from experienced knitters with suggestions for improvements. Get in touch with me at the usual *BAU* address.



In all its noble intricacy, the final pattern is revealed

QUICK TRICKS

- The copy block tool allows you to quickly replicate a portion of a design. This is particularly useful for including fairisle-type borders and the like.
- You can also use a sprite as a brush. This is particularly useful for including a motif that you have previously designed. The shots in this feature show how to do this with a simple jumper front with an appropriate acorn motif.
- You can scale your motif, as has been done here; the two smaller acorns were plotted at half size. The flood fill option makes it easy to try out different colours. But beware; always save your work before messing about with flood fills and always remember to select another tool when you have finished to avoid accidental and irreversible flooding.
- Experiment with the OR, AND and EOR options. These may be used with all *Paint* tools and can provide some interesting effects.

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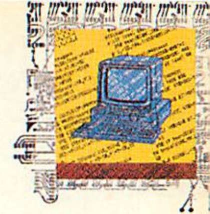
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PAUL SCHOFIELD

ASSEMBLY LINE

Dave Lawrence explains more about how to use the stack

Last month I had just enough space to squeeze in a brief description of the idea behind stacks with a 'real-life' analogy; a pile of sticky memo notes. Now we've got to take the plunge and see how stacks can help us with Arm programming. As I've mentioned before, many of the nice features of Basic – looping, procedures, local variables and so on – rely on stacks. In fact, they are such an important part of any programming language, that there are a handful of Arm instructions specifically set up for handling stacks.

You may be surprised to hear that you do actually already know what they are – well, at least to a certain extent. The two basic instructions are our old(ish) friends LD and ST, previously used for loading and storing bytes and words into registers. If you take a quick glance back at the September 1992 installment, when I first introduced LD and ST, you'll see that by adding an 'R' to either of these, we instruct the Arm to load (or store) a register with a 32-bit word. (An extra 'B' will restrict this to an eight-bit byte). If instead of an 'R' (for register) we add an 'M' (for multiple registers) we have the basic building block for machine-code stacks.

MAKING AN EXAMPLE

In all the example programs so far in this series, we have returned to Basic using the simple instruction MOV pc,link. This has served us well, so why should we want to change it?

Well, hang on until you see the example and then you should see why. Long-standing readers of this series should recognise the output from *Arm1* as the same as my first demonstration program from last February. However, the MOV pc,link has gone, and a couple of rather mysterious lines full of brackets have appeared. Instead of simply copying the return value – stored in link – to the program counter, we are making use of a stack.

To use a stack you need what is known as a stack pointer. If you think back to my sticky telephone note analogy from last month, it would be pretty unhelpful if you stuck each memo note in a completely different place – you'd never know where to look to find out what you were meant to be doing next.

In the real world our stack pointer is intuitive – on top of the last one – but as computers are stupid, we have to be a little bit more precise. When we start out, the stack pointer could be set to 0, when a new task 'arrives', this pointer would be moved on to 1 and a memo stuck there detailing what was going on before this task is started.

If a second task arrived, the pointer would be advanced to 2 and a further note added to the stack. On completion of a task, the most recent note – number 2, from 'slot' 2 in this case – would be examined to find out what was going on and then discarded. The stack pointer would be decremented ready for the completion of the current task or the arrival of a new one.

The Archimedes operating system Risc OS provides the user with a stack pointer in the register R13. This is the one that I have mentioned in the past as being 'software dedicated'. The program counter, R15, and the link register R14 cannot generally be used in the same way as R0 and so on as their functionality is 'restricted' by the processor.

R15 keeps track of program execution and R14 remembers where we were before we got here. R13 has been defined – by the designers of the Arm – to be the stack pointer. There is no law saying that you have to use it as one but,

seeing as just about everyone else does, you'd have a hard time integrating with other people's code if you didn't stick to this rule.

Many processors have dedicated stack pointers that you can only rarely get access to; Motorola's 6502, used in eight-bit Acorn machines has the two instructions TSX and TXS, but that's it, However, having a general-purpose register as a stack pointer adds a great deal of flexibility.

LINKING IT UP

Back to the example. The instruction STMFD (sp)!,{link} is a very gangly looking line, but what it does is quite simple. It pushes the value of link onto the stack. In a similar way, LDMFD (sp)!,{pc} pulls (or pops) a value off the stack into pc – the program counter.

If you think about this for two seconds, you'll see that we've effectively performed the same task as MOV pc,link, as the value of link at the beginning of the routine has been transferred to the program counter at the end of the routine – to return to Basic, but it's gone the scenic route via the stack.

The importance of this is that the value of link can now be altered as much as you like in the body of the routine, because we still 'know the way back to Basic', because a copy of the link value is still on the stack. You may be asking; why would we want to fiddle around with the link register? Well, we may be in need of an extra register in a calculation or something, but miles more importantly, what if we wanted to call a subroutine? We'd need to know how to get back to the main routine . . .

SUBROUTINES

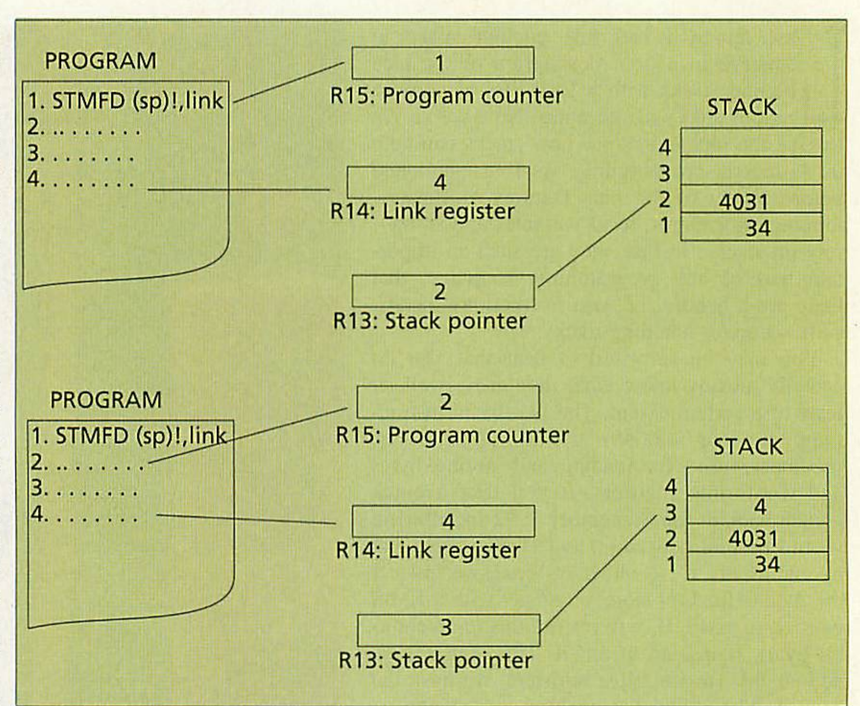
We'll return to the ins and outs of stacks next month and I'll explain what all those brackets and squiggles are for. But this seems like a highly suitable point to digress into the subtle subject of subroutines, so don't panic over the syntax for the moment.

Many of you will be familiar with the Basic structures PROC and FN. These are lovely sugar-coated high-level structures, and we're going to have to take a step back to the wonderful world of the GOSUB to be able to continue. If this is too horrible a thought for you, then just imagine that it is a PROCedure call, but you can't add any parameters to it.

In the July 1992 issue, you met the wonderfully concise instruction B for branch. This makes the program counter jump to a new address and as analogous to that most heinous of Basic keywords, GOTO. By adding an 'L' we transform the GOTO into a GOSUB – equally hideous in many programmers' eyes; but we must put aside our BBC Basic-type prejudices.

The resulting BL instruction means Branch with Link. It is exactly the same as a simple Branch, except the link register is set to the address of the instruction immediately following the BL. If you're quick off the mark, you'll see that a MOV pc,link will therefore perform the equivalent of a RETURN (or ENDPROC) and return control from the end of the subroutine back to the main routine.

You'll also see why it would be a good idea to have stowed a copy of the original link on the stack. If you know any 6502 code, BL and MOV pc,link are equivalent to JSR and RTS.



The status (diagrammatic) of some of the chip registers before (top) and after (below) the execution of an STMFD command. The link register is used in sub-routine programming

Arm2 shows this in action. The two routines hello and world are self-contained and can be CALLed separately (as shown by the demo). But they can also become subroutines to a main routine if careful use is made of the stack. Can you predict what would happen if you didn't use the STM and LDM instructions?

Of course, if these subroutines were going to call further subroutines, they would also need to stack their return addresses. One quite common mistake when developing a large program is to forget to change the MOV pc,link into the appropriate STMs and LDMs, and to wonder what the Dickens is going wrong when you try to run it.

One point worth clarifying at this stage – which may be confusing if you're new to all this sort of thing – is that it is values that get pushed onto and pulled off the stack and not registers themselves. STMFD (sp)!,{link} is read as 'push the link register onto the stack' (missing out the words 'value of the'). I stress this, since you may get a little confused as to why you push a link register onto the stack (see, I said it again) but pull a program counter off.

That's enough on stacks for now but, as promised, we will delve deeper into this enthralling subject next month.

ANY QUESTIONS?

I've nearly come to the end of this series on Arm programming, and I certainly hope that you've enjoyed learning the basics. I am planning to reserve the last article in the series as a questions and answers page, so if you have any queries on Arm programming in general, specifically on this series of articles, or you would like me to cover a topic that you are in the dark about; and you think it would be of interest to everyone else, then drop me a line at the usual *Acorn User* address and I'll see what I can do to help you.



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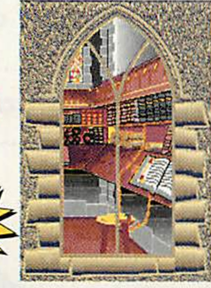


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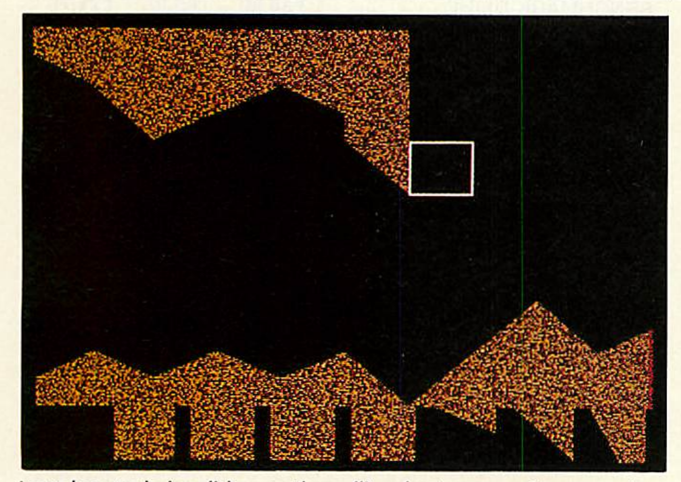




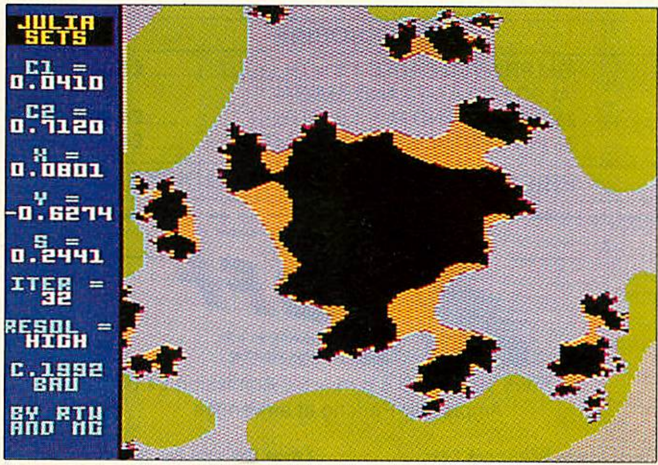


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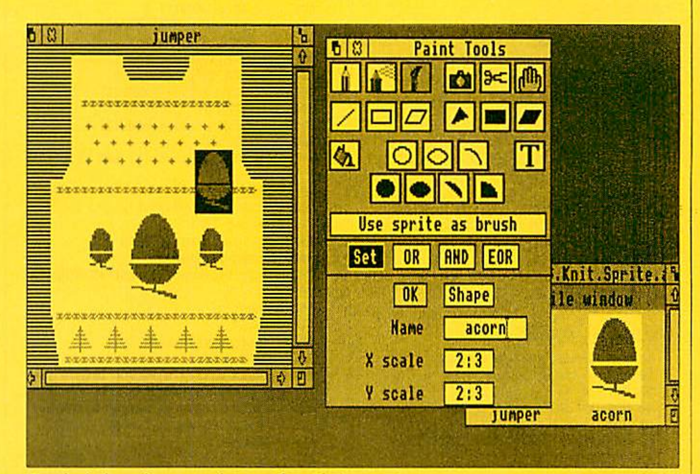
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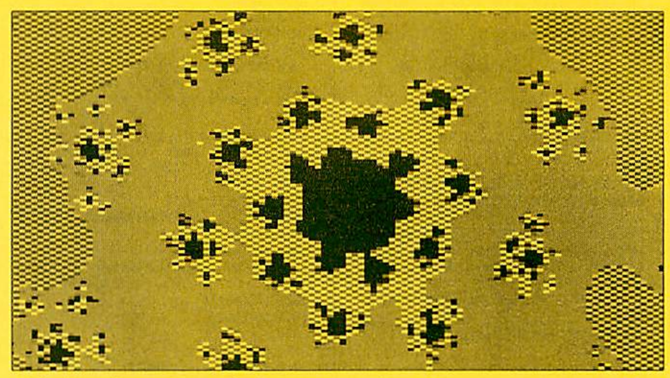
COMPATIBILITY CHART

Use this chart to check if a program will work on your machine. There are two columns, one for eight-bit machines like the Model B and Master 128, and one for 32-bit machines, like the A3000, A400 or A3010. If there is a star for the program in the column then it will work on your machine. Special exceptions and hardware requirements are listed as foot notes at the end of the table.

Article	Program Name	8-bit	32-bit
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GameDes1	*MakeLand*		*
GameDes2	*RandScape*		*
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Info6	*Mine8*	*	
Info7	*Getmc32*		*
Info8	*GetMC8*	*	
Info9	*InputMc8*	*	
Info10	*Inputmc32*		*
Info11	*Inkeymc8*	*	
Info12	*InkeyMC32*		*
Info13	*Inkey-*	*	*
Info14	*Bat32*		*
Info15	*Bat8*	*	
Info16	*Atkinson*	*	*
Info17	*Cumpstey*	*	*
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ASSEMBLY LINE, page 91			
ArcAss1	*Arm1*		*
ArcAss2	*Arm2*		*



Get knitting those tank tops for Christmas!



Eight-bit Julia-mania producing some wacky patterns

SCROLL ON

Listing 1 – MakeLand

```
   10 REM >MakeLand (GamesDes1)
   20 REM by Antony Bruce Lytis
   30 REM for 32-bit machines
   40 REM (c) BAU January 1993
   50 :
   60 MODE 0
   70 DIM sprites 256*1024,screen 8
   80 REPEAT
   90 INPUT"Mode: (13/9) "mode
  100 UNTIL mode=9 OR mode=13
  110 !sprites=256*1024
  120 sprites!8=16
  130 SYS "OS_SpriteOp",&109,sprites
  140 DIM px(100),py(100),n$(100)
  150 DIM x(15),y(15),brown(7),brown_tin
t(7),green(3),green_tint(3)
  160 brown()=0,1,1,1,6,6,6,6
  170 brown_tint()=0,0,&80,&C0,0,&40,&80
,&C0
  180 green()=4,4,4,4
  190 green_tint()=0,&40,&80,&C0
  200 browns=8
  210 greens=4
  220 MODE mode
  230 OFF
  240 IF mode=9 THEN
  250 browns=6
  260 FOR i=0 TO 5
  270 j=INT(i*4/3)
  280 r=4*(brown(j) AND 3)+brown_tint(j)
 DIV 64
  290 g=(brown(j) AND 12)+brown_tint(j)
DIV 64
  300 b=(brown(j) AND 48) DIV 4+brown_ti
nt(j) DIV 64
  310 COLOUR i+10,r*&10,g*&10,b*&10
  320 brown(i)=i+10
  330 NEXT
  340 greens=2
  350 FOR i=0 TO 1
  360 COLOUR i+8,0,&60+i*&20,0
  370 green(i)=i+8
  380 NEXT
  390 ENDIF
  400 FOR size=16 TO 32 STEP 16
  410 CLS
  420 x()=0,1/2,1,1,1,1/2,0,0
  430 y()=1,1,1,1/2,0,0,0,1/2
  440 FOR i=0 TO 7
  450 x(i)=x(i)*size*4
  460 x(i+8)=x(i)
  470 y(i)=y(i)*size*4
  480 y(i+8)=y(i)
  490 NEXT
  500 x=0
  510 y=1024-160
  520 n=0
  530 FOR c=0 TO 7
  540 mod=c MOD 2
  550 FOR o=-1-mod TO 1+mod
  560 ORIGIN x,y
  570 MOVE x(c),y(c)
  580 GCOL 1
  590 MOVE x(c+2-mod),y(c+2-mod)
  600 PLOT 85,x(c+4+o),y(c+4+o)
  610 IF o>=1-mod PLOT 85,x(c+4-mod),y(c
+4-mod)
  620 IF o=1+mod  PLOT 85,x(c+5),y(c+5)
  630 GCOL 2
  640 MOVE x(c),y(c)
  650 DRAW x(c+4+o),y(c+4+o)
  660 n+=1
  670 px(n)=x
  680 py(n)=y
  690 n$(n)="slope"+STR$(c)+STR$((c+4+o)
MOD8)
  700 x+=160
  710 IF x>1280-128 x=0:y-=160
  720 NEXT
  730 NEXT
  740 ORIGIN 0,0
  750 PROCget(0,0,"blank")
  760 GCOL 1
  770 FOR solid=0 TO 3
  780 RECTANGLE FILL size*4*solid*1.5,0,
size*4,size*4
  790 NEXT
  800 PROCbrown
  810 FOR solid=0 TO 3
```

```
 820 PROCget(size*4*solid*1.5,0,"solid"
+STR$solid)
 830 NEXT
 840 FOR i=1 TO n
 850 PROCget(px(i),py(i),n$(i))
 860 NEXT
 870 IF mode=9 THEN
 880 SYS "OS_SpriteOp",&10F,sprites,"pa
lette",1,16,1,mode
 890 SYS "OS_SpriteOp",&118,sprites,"pa
lette" TO ,,pal_spr
 900 pal_dat=pal_spr+44
 910 FOR i=0 TO 15
 920 SYS "OS_ReadPalette",i,16 TO ,,col
1,col2
 930 pal_dat!(8*i)=col1
 940 pal_dat!(8*i+4)=col2
 950 SYS "OS_SpriteOp",&12A,sprites,"pa
lette",i,0,i
 960 NEXT
 970 ENDIF
 980 SYS "OS_SpriteOp",&10C,sprites,"Sc
enery.Land"+STR$size+"/"+STR$mode
 990 NEXT
1000 END
1010 :
1020 DEF PROCget(x,y,name$)
1030 ORIGIN x,y
1040 SYS "OS_SpriteOp",&110,sprites,nam
e$,,0,0,size*4-1,size*4-1
1050 ORIGIN 0,0
1060 ENDPROC
1070 :
1080 DEF PROCbrown
1090 FOR x%=0 TO 1279 STEP 4
1100 FOR y%=0 TO 1023 STEP 4
1110 p%=POINT(x%,y%)
1120 CASE p% OF
1130 WHEN 1:
1140 r%=RND(browns)-1
1150 GCOL brown(r%) TINT brown_tint(r%)
1160 POINT x%,y%
1170 WHEN 2:
1180 r%=RND(greens)-1
1190 GCOL green(r%) TINT green_tint(r%)
1200 POINT x%,y%
1210 ENDCASE
1220 NEXT
1230 NEXT
1240 ENDPROC
```

Listing 2 – RandScape

```
  10 REM >RandScape (GamesDes2)
  20 REM By Antony Bruce Lytis
  30 REM For 32 bit machines
  40 REM (C) BAU January 1993
  50 :
  60 ON ERROR CLOSE #0:PRINTREPORT$;" a
t line ";ERL:END
  70 MODE 8
  80 COLOUR 3
  90 PRINT"Rocky Trade Random Landscape
 Creator"'
 100 PROCget_params
 110 PROCmake_map
 120 out=FNopen_file("Maps."+file$)
 130 PROCwrite_header
 140 PROCwrite_used
 150 PROCwrite_map
 160 CLOSE #out
 170 END
 180 :
 190 DEF PROCget_params
 200 mode=5+4*FNget("16","256"," colour
s")
 210 size=16*FNget("16","32"," pixel bl
ocks")
 220 dir$=MID$("HV",FNget("Horizontal",
"Vertical",""),1)
 230 length=VALFNinput("Length of lands
cape")
 240 file$=FNinput("Filename")
 250 ENDPROC
 260 :
 270 DEF FNinput(str$)
 280 COLOUR 2:PRINT'str$;TAB(23);": ";
 290 COLOUR 1:INPUT""input$
 300 =input$
 310 :
 320 DEF FNget(opt1$,opt2$,rest$)
 330 COLOUR 1:PRINT'LEFT$(opt1$,1);:COL
OUR 2:PRINTMID$(opt1$,2);" or ";
 340 COLOUR 1:PRINTLEFT$(opt2$,1);:COLO
UR 2:PRINTMID$(opt2$,2);rest$;TAB(23);":
 ";
 350 COLOUR 1
 360 keys$=LEFT$(opt1$,1)+LEFT$(opt2$,1
)
 370 REPEAT
 380  key$=GET$
 390  IF key$>="a" AND key$<="z" key$=C
HR$(ASCkey$-32)
 400  key=INSTR(keys$,key$)
 410 UNTIL key>0
 420 IF key=1 PRINT opt1$ ELSE PRINT op
t2$
 430 =key
 440 :
 450 DATA 0,30,40, 27,37,47, 26,36,0
 460 DATA 0,03,04, 72,73,74, 62,63,0
 470 DATA 0,41,40, 52,51,50, 62,61,0
 480 DATA 0,14,04, 25,15,05, 26,16,0
 490 :
 500 DEF PROCmake_map
 510 CASE dir$ OF
 520  WHEN "H":
 530   height=(256 DIV size)-1
 540   RESTORE 450
 550  WHEN "V":
 560   height= 320 DIV size
 570   RESTORE 470
 580 ENDCASE
 590 DIM y(1),y2(1),d(1),d2(1),p(1),a(1
,2,2),lo(1),hi(1)
 600 y()=0,height-1
 610 d()=1,1
 620 lo()=0,size/16
 630 hi()=(height-1-size/16),height-1
 640 FOR p=0 TO 1
 650  FOR i=0 TO 2
 660   FOR j=0 TO 2
 670    READ a(p,i,j)
 680   NEXT
 690  NEXT
 700 NEXT
 710 DIM map(length,height),sprite(255)
,sprite$(255),used(255)
 720 sprite$()="blank","solid0","solid1
","solid2","solid3"
 730 sprite()=0,1,2,3,4
 740 next=5
 750 FOR i=0 TO length-1
 760  REPEAT
 770   FOR p=0 TO 1
 780    REPEAT
 790     REPEAT
 800      d2(p)=RND(3)-1
 810      p(p)=a(p,d(p),d2(p))
 820     UNTIL p(p)<>0
 830     y2(p)=y(p)
 840     CASE d2(p) OF
 850      WHEN 0:y2(p)+=RND(2)-1
 860      WHEN 1:
 870      WHEN 2:y2(p)-=RND(2)-1
 880     ENDCASE
 890    UNTIL y2(p)>=lo(p) AND y2(p)<hi
(p)
 900   NEXT
 910  UNTIL y2(1)>y2(0)+1
 920  FOR p=0 TO 1
 930   IF used(p(p))=0 THEN
 940    used(p(p))=next
 950    sprite$(next)="slope"+RIGHT$("0
0"+STR$p(p),2)
 960    next+=1
 970   ENDIF
 980   map(i,y(p))=used(p(p))
 990   CASE p OF
1000    WHEN 0:IF y(p)>0 FOR h=0 TO y(p
)-1:map(i,h)=RND(4):NEXT
1010    WHEN 1:IF y(p)<height-1 FOR h=y
(p)+1 TO height-1:map(i,h)=RND(4):NEXT
1020   ENDCASE
1030   IF y2(p)=y(p) d(p)=d2(p) ELSE d(
p)=2-d2(p)
1040   y(p)=y2(p)
1050  NEXT
1060 NEXT
1070 ENDPROC
1080 :
1090 DEF FNopen_file(f$)
1100 SYS "OS_File",11,f$,&FFF
1110 =OPENOUT(f$)
1120 :
1130 DEF PROCwrite_header
1140 PROCw("; >Maps."+file$)
1150 PROCw("; "+TIME$)
1160 PROCw("")
1170 PROCw("Type:")
1180 PROCw("  "+dir$+STR$size)
1190 PROCw("")
1200 PROCw("Files:")
1210 PROCw("  Land"+STR$size+"/"+STR$mo
de)
1220 PROCw("")
1230 ENDPROC
1240 :
1250 DEF PROCw(s$)
1260 BPUT #out,s$+CHR$10;
1270 ENDPROC
1280 :
1290 DEF PROCwrite_used
1300 PROCw("Used:")
1310 FOR spr=0 TO next-1
1320  PROCw("  "+RIGHT$("00"+STR$~spr,2
)+" "+sprite$(spr))
1330 NEXT
1340 PROCw("")
1350 ENDPROC
1360 :
1370 DEF PROCwrite_map
1380 PROCw("Map:")
1390 FOR i=0 TO length-1
1400  out$=""
1410  FOR j=0 TO height-1
1420   out$+=RIGHT$("00"+STR$~map(i,j),
2)
1430  NEXT
1440  z$=STRING$(LENout$,"0")
1450  REPEAT
1460   z$=MID$(z$,3)
1470   z=INSTR(out$,z$)
1480  UNTIL z$="" OR (z MOD 2)=1
1490  IF LENz$>0 out$=LEFT$(out$,z-1)+"
-"+MID$(out$,z+LENz$)
1500  PROCw("  "+out$)
1510 NEXT
1520 ENDPROC
```

Listing 3 – Demo32H

```
  ; >Maps.Demo32H
; Mon,09 Nov 1992.23:35:46

Type:
  H32

Files:
  Land32/13

Used:
  00 blank
  04 solid0
  06 solid1
  11 solid2
  1C solid3
  20 slope03
  1F slope04
  10 slope05
  12 slope13
  0B slope14
  07 slope16
  21 slope17
  22 slope25
  05 slope26
  03 slope27
  08 slope35
  18 slope36
  01 slope37
  1D slope30
  0D slope31
  09 slope47
  0A slope40
  23 slope41
  1A slope57
  0E slope50
  14 slope51
  15 slope52
  1E slope53
  0F slope61
  16 slope62
  17 slope63
  13 slope71
  19 slope72
  02 slope73
  1B slope74
  0C slope75

Map:
  01-02
  01-02
  01-02
  01-02
  03-02
  0405-02
  06040708-02
  04060409-02
  06040A-0B0C
  0D0E-0F04
  01-0B1011
  01-1210041104
  01-1314150411
  01-1604
  01-17
  01001218-02
  0100191A-02
  03-1B
  0405-17
  110418-02
  041C01-02
  1C0403-02
  1C1C1D-02
  041C09-0B0C
  1C1C-131E04
  041D-1B0D
  0409-1F0409
  0A-1210041D00
  -1B04110100
  -170A0F1A00
  -00
  18-0B
  01-121004
  01-131E11
  03-1904
  0D1A-0F
  01-0B
  01-0F
  01-20
  03-02
  1D-02
  01-02
  01-02
  01-02
  01-02
  01-02
  01-02
  01-02
  01-02
  01-19
  2122-
  110A-
  0422030B08-
  1111060409-
  040D140E-
  231A-
```

Listing 4 – EdLand

```
  10 REM >EdLand (GameDes4)
  20 REM By Antony Bruce Lytis
  30 REM For 32 bit machines
  40 REM (C) BAU January 1993
  50 :
  60 MODE 13:OFF
  70 PROCinit
  80 maps$="Maps"
  90 scenery$="Scenery"
 100 PROCinit_sbuffer
 110 PROCload(TRUE)
 120 PROCedit
 130 END
 140 :
 150 DEF PROCinit
 160 dir$="H"
 170 size=16
 180 maxwid=320 DIV 16
 190 maxlen=16384 DIV size
 200 PROCset_vars(dir$,size)
 210 DIM sprname$(256),map maxwid*maxle
n,buffer 20
 220 DIM file$(16),used(256)
 230 DIM piece(1),pcol(1)
 240 pcol()=%000011,%110000
 250 file$="Default"
 260 ox=-1:oy=-1
 270 x=-1:y=-1
 280 ENDPROC
 290 :
 300 DEF PROCset_vars(d$,s)
 310 menugap=s*1.25
 320 menusize=320 DIV menugap
 330 sqr=s*4
 340 xsize=320 DIV s
 350 ysize=256 DIV s
 360 CASE d$ OF
 370 WHEN "H" : across=ysize:xm=maxwid:
ym=1:top=across-2
 380 WHEN "V" : across=xsize:xm=1:ym=ma
xwid:top=across-1
 390 ENDCASE
 400 ENDPROC
 410 :
 420 DEF PROCinit_sbuffer
 430 sbsize=HIMEM-END-32768
 440 DIM sbuffer sbsize
 450 !sbuffer=sbsize
 460 sbuffer!8=16
 470 SYS "OS_SpriteOp",&109,sbuffer
 480 ENDPROC
 490 :
 500 DEF PROCclear_sprites
 510 SYS "OS_SpriteOp",&109,sbuffer
 520 ENDPROC
 530 :
 540 DEF PROCload_sprites(file$)
 550 SYS "OS_SpriteOp",&10B,sbuffer,fil
e$
 560 ENDPROC
 570 :
 580 DEF PROCsprite_names
 590 FOR s=0 TO sprites-1
 600 sprname$(s)=FNsprite_name(s+1)
 610 NEXT
 620 ENDPROC
 630 :
 640 DEF FNnoof_sprites
 650 SYS "OS_SpriteOp",&108,sbuffer TO
,,,number
 660 =number
 670 :
 680 DEF FNsprite_name(spr)
 690 SYS "OS_SpriteOp",&10D,sbuffer,buf
fer,20,spr TO ,,,nlen
 700 buffer?nlen=13
 710 =$buffer
 720 :
 730 DEF PROCsprite(spr$,sx,sy)
 740 SYS "OS_SpriteOp",&122,sbuffer,spr
$,sx,sy
 750 ENDPROC
 760 :
 770 DEF PROCclear_map
 780 FOR i=0 TO maxwid*maxlen-1 STEP 4
 790 map!i=0
 800 NEXT
 810 ENDPROC
 820 :
 830 DEF FNstrip(a$)
 840 WHILE LEFT$(a$,1)=" "
 850 a$=MID$(a$,2)
 860 ENDWHILE
 870 WHILE RIGHT$(a$,1)=" "
 880 a$=LEFT$(a$)
 890 ENDWHILE
 900 =a$
 910 :
 920 DEF FNfind_sprite(spr$)
 930 spr=sprites
 940 REPEAT
 950 spr-=1
 960 UNTIL spr=0 OR spr$=sprname$(spr)
 970 IF spr$=sprname$(spr) THEN =spr
 980 ERROR 1,"Unknown sprite '"+spr$+"'
"
 990 :
1000 DEF FNlo(a$)
1010 b$=""
1020 FOR lo=1 TO LENa$
1030 c$=MID$(a$,lo,1)
1040 IF c$>="A" AND c$<="Z" c$=CHR$(ASC
c$+32)
1050 b$+=c$
1060 NEXT
1070 =b$
1080 :
1090 DEF PROCscreen
1100 CASE dir$ OF
1110 WHEN "H":
1120 FOR col=0 TO xsize-1
```

```
1130 PROCcolumn(xpos+col)
1140 NEXT
1150 WHEN "V":
1160 FOR row=0 TO ysize-1
1170 PROCrow(ypos+row)
1180 NEXT
1190 ENDCASE
1200 ENDPROC
1210 :
1220 DEF PROCcolumn(column)
1230 FOR i=0 TO ysize-2
1240 PROCsquare(column,i)
1250 NEXT
1260 ENDPROC
1270 :
1280 DEF PROCrow(row)
1290 FOR i=0 TO xsize-1
1300 PROCsquare(i,row)
1310 NEXT
1320 ENDPROC
1330 :
1340 DEF PROCpoke(px,py,poke)
1350 map?(px*xm+py*ym)=poke
1360 ENDPROC
1370 :
1380 DEF PROCsquare(sx,sy)
1390 PROCsprite(sprname$(map?(sx*xm+sy*ym)),(sx-xpos)*sqr,(sy-ypos+1)*sqr)
1400 ENDPROC
1410 :
1420 DEF PROCmenu(start)
1430 i=0
1440 REPEAT
1450 PROCmenu_piece(start+i,i)
1460 i+=1
1470 UNTIL i=menusize OR start+i>=sprites
1480 ENDPROC
1490 :
1500 DEF PROCmenu_piece(mp,at)
1510 PROCsprite(sprname$(mp),at*menugap*4+size/2,0)
1520 ENDPROC
1530 :
1540 DEF PROCclear_menu
1550 GCOL 128
1560 VDU 24,0;0;1279;sqr-4;16,26
1570 ENDPROC
1580 :
1590 DEF PROCpiece(num)
1600 off=piece(num)-sprpos
1610 IF off>=0 AND off<menusize THEN
1620 GCOL 3,pcol(num)
1630 RECTANGLE off*menugap*4+size/2,0,sqr-4,sqr-4
1640 ENDIF
1650 ENDPROC
1660 :
1670 DEF PROCcurs(cx,cy)
1680 IF cx<0 OR cy<0 ENDPROC
1690 GCOL 3,63
1700 RECTANGLE cx*sqr,(cy+1)*sqr,sqr-4,sqr-4
1710 ENDPROC
1720 :
1730 DEF PROCedit
1740 MOUSE ON
1750 last=0
1760 held=TRUE
1770 REPEAT
1780 MOUSE mx,my,z
1790 y=(my DIV sqr)-1
1800 x=mx DIV sqr
1810 CASE y OF
1820 WHEN -1:
1830 IF (last=1 AND z=0) OR last=2 THEN
1840 IF last=1 PROCcurs(ox,oy)
1850 ox=-1
1860 oy=-1
1870 last=2
1880 IF z<>0 THEN
1890 x=mx DIV (size/2)
1900 piece=x DIV 10
1910 pos=x MOD 10
1920 IF pos>0 AND pos<9 THEN
1930 IF z AND 4 PROCnew_piece(0,sprpos+piece)
1940 IF z AND 1 PROCnew_piece(1,sprpos+piece)
1950 held=TRUE
1960 ELSE
1970 IF z AND 2 THEN
1980 PROCslide_menu
1990 ELSE
2000 but=0
2010 dir=0
2020 IF z AND 4 but=1
2030 IF z AND 1 but=-1
2040 IF piece=0 AND pos=0 dir=-1
2050 IF piece=menusize-1 AND pos=9 dir=1
2060 PROCscroll_pieces(dir*but)
2070 ENDIF
2080 ENDIF
2090 ENDIF
2100 ENDIF
2110 OTHERWISE:
2120 IF z AND 2 THEN
2130 PROCcurs(ox,oy)
2140 ox=-1:oy=-1
2150 CASE dir$ OF
2160 WHEN "H" : PROCslide_H
2170 WHEN "V" : PROCslide_V
2180 ENDCASE
2190 ELSE
2200 IF x<>ox OR y<>oy THEN
2210 PROCcurs(ox,oy)
2220 PROCcurs(x,y)
2230 ox=x
2240 oy=y
2250 last=1
2260 ENDIF
2270 IF z=0 THEN
2280 held=FALSE
2290 ELSE
2300 IF NOT held THEN
2310 IF z AND 4 PROCplace(piece(0))
2320 IF z AND 1 PROCplace(piece(1))
2330 ENDIF
2340 ENDIF
2350 ENDIF
2360 ENDCASE
2370 k=INKEY0
2380 CASE k OF
2390 WHEN 3 :
2400 WHEN 19 : PROCsave
2410 WHEN 12 : PROCload(FALSE)
2420 ENDCASE
2430 UNTIL FALSE
2440 ENDPROC
2450 :
2460 DEF PROCnew_piece(num,clicked)
2470 IF clicked<>piece(num) AND clicked<>piece(1-num) AND clicked<sprites THEN
2480 PROCpiece(num)
2490 piece(num)=clicked
2500 PROCpiece(num)
2510 ENDIF
2520 ENDPROC
2530 :
2540 DEF PROCplace(piece)
2550 IF piece<0 piece=0
2560 PROCpoke(xpos+x,ypos+y,piece)
2570 PROCsquare(xpos+x,ypos+y)
2580 PROCcurs(x,y)
2590 ENDPROC
2600 :
2610 DEF PROCscroll_pieces(dir)
2620 IF sprpos+dir<0 OR sprpos+menusize-1+dir>=sprites OR ABSdir<>1 ENDPROC
2630 FOR scroll=0 TO menugap-1 STEP 4
2640 WAIT
2650 RECTANGLE FILL 0,0,1279,sqr-4 TO -dir*16,0
2660 NEXT
2670 sprpos+=dir
2680 CASE dir OF
2690 WHEN -1: at=0
2700 WHEN  1: at=menusize-1
2710 ENDCASE
2720 PROCmenu_piece(sprpos+at,at)
2730 IF sprpos+at=piece(0) PROCpiece(0)
2740 IF sprpos+at=piece(1) PROCpiece(1)
2750 ENDPROC
2760 :
2770 DEF PROCslide_H
2780 MOUSE OFF
2790 MOUSE RECTANGLE -2000,0,4000,0
2800 MOUSE TO 0,0
2810 REPEAT
2820 REPEAT
2830 MOUSE sx,sy,sz
2840 slide=sx DIV sqr
2850 UNTIL sz=0 OR slide<>0
2860 mx+=sx
2870 MOUSE TO 0,0
2880 IF slide<>0 THEN
2890 IF xpos-slide>=0 AND xpos+xsize-1-slide<maxlen THEN
2900 RECTANGLE FILL 0,sqr,1279,1023-sqr TO slide*sqr,sqr
2910 xpos-=slide
2920 IF slide>0 first=0 ELSE first=xsize+slide
2930 FOR col=0 TO ABS(slide)-1
2940 PROCcolumn(xpos+first+col)
2950 NEXT
2960 ENDIF
2970 ENDIF
2980 UNTIL sz=0
2990 IF mx<0 mx=0
3000 IF mx>1279 mx=1279
3010 MOUSE RECTANGLE 0,0,1279,1023
3020 MOUSE TO mx,my
3030 MOUSE ON
3040 ENDPROC
3050 :
3060 DEF PROCslide_V
3070 MOUSE OFF
3080 MOUSE RECTANGLE 0,-2000,0,4000
3090 MOUSE TO 0,0
3100 VDU 24,0;sqr;1279;1023;
3110 REPEAT
3120 REPEAT
3130 MOUSE sx,sy,sz
3140 slide=sy DIV sqr
3150 UNTIL sz=0 OR slide<>0
3160 my+=sy
3170 MOUSE TO 0,0
3180 IF slide<>0 THEN
3190 IF ypos-slide>=0 AND ypos+ysize-1-slide<maxlen THEN
3200 RECTANGLE FILL 0,sqr,1279,1023-sqr TO 0,sqr+slide*sqr
3210 ypos-=slide
3220 IF slide>0 first=0 ELSE first=ysize-1+slide
3230 FOR row=0 TO ABS(slide)-1
3240 PROCrow(ypos+first+row):REM,first+row)
3250 NEXT
3260 ENDIF
3270 ENDIF
3280 UNTIL sz=0
3290 IF my<0 my=0
3300 IF my>1023 my=1023
3310 VDU 26
3320 MOUSE RECTANGLE 0,0,1279,1023
3330 MOUSE TO mx,my
3340 MOUSE ON
3350 ENDPROC
3360 :
3370 DEF PROCslide_menu
3380 MOUSE OFF
3390 MOUSE RECTANGLE -2000,0,4000,0
3400 MOUSE TO 0,0
3410 PROCpiece(0):PROCpiece(1)
3420 REPEAT
3430 REPEAT
3440 MOUSE sx,sy,sz
3450 slide=sx DIV 64
3460 UNTIL sz=0 OR slide<>0
3470 mx+=sx
3480 MOUSE TO 0,0
3490 IF slide<>0 THEN
3500 IF sprpos-slide>=0 AND sprpos+menusize-1-slide<sprites THEN
3510 RECTANGLE FILL 0,0,1279,sqr-4 TO slide*menugap*4,0
3520 sprpos-=slide
3530 IF slide>0 first=0 ELSE first=menusize+slide
3540 FOR p=0 TO ABS(slide)-1
3550 PROCmenu_piece(sprpos+first+p,first+p)
3560 NEXT
3570 ENDIF
3580 ENDIF
3590 UNTIL sz=0
3600 IF mx<0 mx=0
3610 IF mx>1279 mx=1279
3620 MOUSE RECTANGLE 0,0,1279,1023
3630 MOUSE TO mx,my
3640 MOUSE ON
3650 PROCpiece(0):PROCpiece(1)
3660 ENDPROC
3670 :
3680 DEF PROCsave
3690 PROCclear_menu
3700 PROCcurs(ox,oy)
3710 VDU 30:*Cat Maps
3720 new$=FNinput("Save : ",file$)
3730 IF new$<>"" THEN
3740 length=FNlength
3750 PROCfind_used
3760 file$=new$
3770 SYS "OS_File",11,maps$+"."+file$,&FFF
3780 out=OPENOUT(maps$+"."+file$)
3790 PROCw("; >"+maps$+"."+file$)
3800 PROCw("; "+TIME$)
3810 PROCw("")
3820 PROCw("Type:")
3830 PROCw("  "+dir$+STR$(size))
3840 PROCw("")
3850 PROCw("Files:")
3860 FOR i=0 TO files-1
3870 PROCw("  "+file$(i))
3880 NEXT
3890 PROCw("")
3900 PROCw("Used:")
3910 FOR i=0 TO 255
3920 IF used(i)>=0 THEN
3930 PROCw("  "+RIGHT$("00"+STR$~used(i),2)+" "+sprname$(i))
3940 ENDIF
3950 NEXT
3960 PROCw("")
3970 PROCw("Map:")
3980 off=map
3990 FOR w=0 TO length-1
4000 out$=""
4010 FOR i=0 TO top
4020 out$+=RIGHT$("00"+STR$~(used(off?i)),2)
4030 NEXT
4040 z$=STRING$(LENout$,"0")
4050 REPEAT
4060 z$=MID$(z$,3)
4070 z=INSTR(out$,z$)
4080 UNTIL z$="" OR (z MOD 2)=1
4090 IF LENz$>0 out$=LEFT$(out$,z-1)+"-"+MID$(out$,z+LENz$)
4100 PROCw("  "+out$)
4110 off+=maxwid
4120 NEXT
4130 CLOSE #out
4140 ENDIF
4150 PROCscreen
4160 PROCcurs(x,y)
4170 PROCclear_menu
4180 PROCmenu(sprpos)
4190 PROCpiece(0):PROCpiece(1)
4200 ENDPROC
4210 :
4220 DEF PROCw(o$)
4230 BPUT #out,o$+CHR$10;
4240 ENDPROC
4250 :
4260 DEF FNinput(prompt$,ins$)
4270 PRINTTAB(4,30);prompt$;SPC10;STRING$(10,CHR$127);
4280 FOR i=1 TO LENins$
4290 SYS "OS_Byte",138,0,ASCMID$(ins$,i,1)
4300 NEXT
4310 ON
4320 a$=""
4330 *FX229,1
4340 REPEAT
4350 c=GET
4360 IF c>32 AND c<127 AND LENa$<10 a$+=CHR$c:VDU c
4370 IF c=127 AND a$<>"" a$=LEFT$(a$):VDU 127
4380 IF c=27 AND INKEY-1 SYS 6,229:SYS 6,125
4390 IF c=27 OR c=21 PRINTSTRING$(LENa$,CHR$127);:a$=""
4400 UNTIL c=13 OR c=27
4410 OFF
4420 *FX229,0
4430 =a$
4440 :
4450 DEF FNlength
4460 w=maxlen
4470 REPEAT
4480 w-=1
4490 UNTIL w=0 OR FNnot_blank(w)
4500 =w+1
4510 :
4520 DEF FNnot_blank(c)
4530 nb=-4
4540 REPEAT
4550 nb+=4
4560 UNTIL nb>top OR map!(c*maxwid+nb)<>0
4570 =(map!(c*maxwid+nb)<>0)
4580 :
4590 DEF PROCfind_used
4600 used()=-1
4610 used(0)=0
4620 next=1
4630 FOR i=0 TO length-1
4640 FOR j=0 TO across-1
4650 k=map?(i*maxwid+j)
4660 IF used(k)<0 used(k)=next:next+=1
4670 NEXT
4680 NEXT
4690 ENDPROC
4700 :
4710 DEF PROCload(force)
4720 PROCclear_menu
4730 PROCcurs(ox,oy)
4740 VDU 30:*Cat Maps
4750 REPEAT
4760 new$=FNinput("Load : ",file$)
4770 IF new$<>"" THEN
4780 ok=FNok(maps$+"."+new$)
4790 ELSE
4800 ok=NOT force
4810 ENDIF
4820 UNTIL ok
4830 IF new$<>"" THEN
4840 file$=new$
4850 in=OPENIN("Maps."+file$)
4860 mode$=""
4870 REPEAT
4880 REPEAT
4890 in$=FNstrip(GET$#in)
4900 UNTIL EOF#in OR (LEFT$(in$,1)<>";" AND in$<>"")
4910 IF in$<>"" THEN
4920 IF RIGHT$(in$,1)=":" THEN
4930 mode$=in$
4940 CASE mode$ OF
4950 WHEN "Type:":
4960 REM nothing
4970 WHEN "Files:":
4980 files=0
4990 PROCclear_sprites
5000 WHEN "Used:":
5010 sprites=FNnoof_sprites
5020 PROCsprite_names
5030 used()=-1
5040 WHEN "Map:"
5050 PROCclear_map
5060 store=map
5070 ENDCASE
5080 ELSE
5090 CASE mode$ OF
5100 WHEN "Type:"
5110 dir$=LEFT$(in$,1)
5120 size=VALMID$(in$,2)
5130 PROCset_vars(dir$,size)
5140 WHEN "Files:"
5150 PROCload_sprites("Scenery."+in$)
5160 file$(files)=in$
5170 files+=1
5180 WHEN "Used:"
5190 spc=INSTR(in$," ")
5200 spr=EVAL("&"+LEFT$(in$,2))
5210 used(spr)=FNfind_sprite(FNlo(MID$(in$,spc+1)))
5220 WHEN "Map:"
5230 IF INSTR(in$,"-")=0 in$+="-"
5240 i=0
5250 WHILE LEFT$(in$,1)<>"-"
5260 store?i=used(EVAL("&"+LEFT$(in$,2)))
5270 i+=1
5280 in$=MID$(in$,3)
5290 ENDWHILE
5300 in$=MID$(in$,2)
5310 i=top
5320 WHILE in$<>""
5330 store?i=used(EVAL("&"+RIGHT$(in$,2)))
5340 i-=1
5350 in$=LEFT$(in$,LENin$-2)
```

```
 5360 ENDWHILE
 5370 store+=maxwid
 5380 ENDCASE
 5390 ENDIF
 5400 ENDIF
 5410 UNTIL EOF#in
 5420 CLOSE #in
 5430 SYS "OS_SpriteOp",&128,sbuffer,"bl
ank" TO ,,,,,,mode
 5440 IF MODE<>mode MODE mode:OFF
 5450 IF mode=9 THEN
 5460 SYS "OS_SpriteOp",&118,sbuffer,"pa
lette" TO ,,pal_spr
 5470 pal_dat=pal_spr+44
 5480 FOR i=0 TO 15
 5490 a=pal_dat+8*i
 5500 COLOUR i,a?1,a?2,a?3
 5510 NEXT
 5520 ENDIF
 5530 piece()=0,-1
 5540 xpos=0
 5550 ypos=0
 5560 sprpos=0
 5570 ENDIF
 5580 PROCscreen
 5590 PROCclear_menu
 5600 PROCmenu(sprpos)
 5610 PROCpiece(0):PROCpiece(1)
 5620 PROCcurs(x,y)
 5630 ENDPROC
 5640 :
 5650 DEF FNok(f$)
 5660 SYS "OS_File",5,f$ TO type
 5670 =(type=1)
```

Listing 5 – BasScape

```
   10 REM >BasScape (GameDes5)
   20 REM by Antony Bruce Lytis
   30 REM for 32-bit machines
   40 REM (c) BAU January 1993
   50 :
   60 MODE 0
   70 OFF
   80 DIM land 64*1024,scenery 64*1024,s
cene_spr 4*256
   90 !scenery=64*1024
  100 scenery!4=0
  110 scenery!8=16
  120 scenery!12=16
  130 *CAT Maps
  140 REPEAT
  150 INPUT"Which landscape? "land$
  160 SYS "XOS_File",5,"Maps."+land$ TO
exists%
  170 UNTIL exists%=1
  180 PROCload_map(land$)
  190 FOR b=0 TO 1
  200 MODE mode+128*b
  210 PRINTTAB(0,31)"Scrolling landscape
 (mode ";mode;")";
  220 NEXT
  230 IF mode=9 THEN
  240 SYS "OS_SpriteOp",&118,scenery,"pa
lette" TO ,,pal_spr
  250 pal_dat=pal_spr+44
  260 FOR i=0 TO 15
  270 a=pal_dat+8*i
  280 COLOUR i,a?1,a?2,a?3
  290 NEXT
  300 ENDIF
  310 OFF
  320 IF dir%=0 THEN
  330 end=land_ext*size/sprite_width
  340 ahead=320
  350 x=1-ahead
  360 REPEAT
  370 WAIT
  380 VDU 26
  390 RECTANGLE FILL 0,64,1279,1023 TO -
8,64
  400 VDU 24,1272;64;1279;1023;
  410 a=land+no*((x+ahead-1) DIV size)
  420 y=1024-4*size
  430 FOR i=0 TO no-1
  440 SYS &2E,&222,scenery,scene_spr!(4*
a?i),1272-4*((x+ahead-1) MOD size),y
  450 y-=4*size
  460 NEXT
  470 x+=2
  480 UNTIL x+ahead+16>end
  490 ELSE
  500 end=land_ext*size/sprite_width
  510 IF size=32 ahead=224 ELSE ahead=24
0
  520 y=1-ahead
  530 REPEAT
  540 WAIT
  550 VDU 26
  560 RECTANGLE FILL 0,64,1279,1023 TO 0
,60
  570 VDU 24,0;1016;1279;1023;
  580 a=land+no*((y+ahead-1) DIV size)
  590 x=1280-4*size
  600 FOR i=0 TO no-1
  610 SYS &2E,&222,scenery,scene_spr!(4*
a?i),x,1020-4*((y+ahead-1) MOD size)
  620 x-=4*size
  630 NEXT
  640 y+=1
  650 UNTIL y+ahead+16>end
  660 ENDIF
  670 END
  680 :
  690 DEF PROCload_map(file$)
  700 in%=OPENIN("Maps."+file$)
  710 x%=0
  720 m%=0
  730 FOR i=0 TO 255
  740 scene_spr!(4*i)=-1
  750 NEXT
  760 WHILE NOT EOF#in%
  770 s$=FNstrip(GET$#in%)
  780 IF s$<>"" THEN
  790 CASE s$ OF
  800 WHEN "Files:":m%=1
  810 WHEN "Used:":m%=2
  820 WHEN "Map:":m%=3
  830 WHEN "Type:":m%=4
  840 OTHERWISE
  850 CASE m% OF
  860 WHEN 1:SYS "OS_SpriteOp",&10B,scen
ery,"Scenery."+s$
  870 WHEN 2:
  880 i=EVAL("&"+LEFT$(s$,2))
  890 s$=FNstrip(MID$(s$,3))
  900 SYS "OS_SpriteOp",&118,scenery,s$
TO ,,d%
  910 scene_spr!(4*i)=d%
  920 IF s$="blank" THEN
  930 blnk=i
  940 SYS "OS_SpriteOp",&128,scenery,s$
TO ,,,,,,mode
  950 ENDIF
  960 WHEN 3:
  970 dash%=INSTR(s$,"-")
  980 IF dash%>0 THEN
  990 s1$=LEFT$(s$,dash%-1)
 1000 s3$=MID$(s$,dash%+1)
 1010 s2$=RIGHT$("0"+STR$~blnk,2)
 1020 s$=s1$+STRING$(no-LEN(s1$+s3$)/2,s
2$)+s3$
 1030 ENDIF
 1040 a%=land+no*x%
 1050 FOR i=0 TO no-1
 1060 a%?i=blnk
 1070 NEXT
 1080 y%=no-1
 1090 WHILE s$<>""
 1100 a%?y%=EVAL("&"+LEFT$(s$,2))
 1110 s$=MID$(s$,3)
 1120 y%-=1
 1130 ENDWHILE
 1140 x%+=1
 1150 WHEN 4:
 1160 size=VALMID$(s$,2)
 1170 IF LEFT$(s$,1)="H" THEN
 1180 dir%=0
 1190 IF size=32 total_size=224 ELSE tot
al_size=240
 1200 ELSE
 1210 dir%=1
 1220 total_size=320
 1230 ENDIF
 1240 no=total_size DIV size
 1250 ENDCASE
 1260 ENDCASE
 1270 ENDIF
 1280 ENDWHILE
 1290 SYS "OS_ReadModeVariable",mode,6 T
O ,,bytes_per_row
 1300 screen_size=total_size*bytes_per_r
ow
 1310 IF mode=9 sprite_width=size DIV 2
ELSE sprite_width=size
 1320 land_ext=x%*sprite_width
 1330 FOR i=0 TO 255
 1340 IF scene_spr!(4*i)=-1 THEN scene_s
pr!(4*i)=blnk
 1350 NEXT
 1360 CLOSE#in%
 1370 ENDPROC
 1380 :
 1390 DEF FNstrip(s$)
 1400 WHILE LEFT$(s$,1)=" "
 1410 s$=MID$(s$,2)
 1420 ENDWHILE
 1430 WHILE RIGHT$(s$)=" "
 1440 s$=LEFT$(s$)
 1450 ENDWHILE
 1460 =s$
```

Listing 6 – VScape

```
   10 REM >VScape (GameDes6)
   20 REM by Antony Bruce Lytis
   30 REM for 32 bit machines
   40 REM (c) BAU January 1993
   50 :
   60 MODE 0
   70 OFF
   80 DIM land 64*1024,scenery 64*1024,s
cene_spr 4*256
   90 !scenery=64*1024
  100 scenery!4=0
  110 scenery!8=16
  120 scenery!12=16
  130 *CAT Maps
  140 REPEAT
  150 INPUT"Which landscape? "land$
  160 SYS "XOS_File",5,"Maps."+land$ TO
exists%
  170 UNTIL exists%=1
  180 total_rows=256
  190 PROCload_map(land$)
  200 PROCass
  210 FOR row%=0 TO total_rows-1
  220 A%=bank+bytes_per_row*(255-row%)
  230 B%=row%
  240 C%=land
  250 D%=scene_spr
  260 CALL show_row
  270 NEXT
  280 MODE mode
  290 OFF
  300 IF mode=9 THEN
  310 SYS "OS_SpriteOp",&118,scenery,"pa
lette" TO ,,pal_spr
  320 pal_dat=pal_spr+44
  330 FOR i=0 TO 15
  340 a=pal_dat+8*i
  350 COLOUR i,a?1,a?2,a?3
  360 NEXT
  370 ENDIF
  380 OFF
  390 CALL scroll
  400 MODE 0
  410 END
  420 :
  430 DEF PROCload_map(file$)
  440 in%=OPENIN("Maps."+file$)
  450 x%=0
  460 m%=0
  470 FOR i=0 TO 255
  480 scene_spr!(4*i)=-1
  490 NEXT
  500 WHILE NOT EOF#in%
  510 s$=FNstrip(GET$#in%)
  520 IF s$<>"" THEN
  530 CASE s$ OF
  540 WHEN "Files:":m%=1
  550 WHEN "Used:":m%=2
  560 WHEN "Map:":m%=3
  570 WHEN "Type:":m%=4
  580 OTHERWISE
  590 CASE m% OF
  600 WHEN 1:SYS "OS_SpriteOp",&10B,scen
ery,"Scenery."+s$
  610 WHEN 2:
  620 i=EVAL("&"+LEFT$(s$,2))
  630 s$=FNstrip(MID$(s$,3))
  640 SYS "OS_SpriteOp",&118,scenery,s$
TO ,,d%
  650 scene_spr!(4*i)=d%
  660 IF s$="blank" THEN
  670 blnk=i
  680 SYS "OS_SpriteOp",&128,scenery,s$
TO ,,,,,,mode
  690 ENDIF
  700 WHEN 3:
  710 dash%=INSTR(s$,"-")
  720 IF dash%>0 THEN
  730 s1$=LEFT$(s$,dash%-1)
  740 s3$=MID$(s$,dash%+1)
  750 s2$=RIGHT$("0"+STR$~blnk,2)
  760 s$=s1$+STRING$(no-LEN(s1$+s3$)/2,s
2$)+s3$
  770 ENDIF
  780 a%=land+no*x%
  790 FOR i=0 TO no-1
  800 a%?i=blnk
  810 NEXT
  820 y%=no-1
  830 WHILE s$<>""
  840 a%?y%=EVAL("&"+LEFT$(s$,2))
  850 s$=MID$(s$,3)
  860 y%-=1
  870 ENDWHILE
  880 x%+=1
  890 WHEN 4:
  900 size=VALMID$(s$,2)
  910 IF LEFT$(s$,1)="H" THEN
  920 ERROR 17,"Only vertical landscapes
 please!"
  930 ELSE
  940 total_size=320
  950 ENDIF
  960 no=total_size DIV size
  970 ENDCASE
  980 ENDCASE
  990 ENDIF
 1000 ENDWHILE
 1010 SYS "OS_ReadModeVariable",mode,6 T
O ,,bytes_per_row
 1020 screen_size=total_size*total_rows
 1030 IF mode=9 sprite_width=size DIV 2:
screen_size=screen_size DIV 2 ELSE sprit
e_width=size
 1040 land_ext=x%*size
 1050 FOR i=0 TO 255
 1060 IF scene_spr!(4*i)=-1 THEN scene_s
pr!(4*i)=blnk
 1070 NEXT
 1080 CLOSE#in%
 1090 ENDPROC
 1100 :
 1110 DEF FNstrip(s$)
 1120 WHILE LEFT$(s$,1)=" "
 1130 s$=MID$(s$,2)
 1140 ENDWHILE
 1150 WHILE RIGHT$(s$)=" "
 1160 s$=LEFT$(s$)
 1170 ENDWHILE
 1180 =s$
 1190 :
 1200 DEF PROCass
 1210 DIM code% &800+screen_size
 1220 sp=13:link=14:pc=15
 1230 VIDC=&3400000
 1240 FOR pass%=0 TO 2 STEP 2
 1250 P%=code%
 1260 [OPT pass%
 1270 .scroll STMFD   (sp)!,{r0-r12,link
}
 1280 MOV     r11,#1
 1290 MOV     r10,#0
 1300 .sloop  BL      swap_banks
 1310 MOV     r0,#&F00
 1320 BL      set_border
 1330 BL      copy_bank
 1340 MOV     r0,#&0F0
 1350 BL      set_border
 1360 BL      scroll_on
 1370 MOV     r0,#&000
 1380 BL      set_border
 1390 SWI     "XOS_ReadEscapeState"
 1400 BCC     sloop
 1410 MOV     r0,#126
 1420 SWI     "XOS_Byte"
 1430 LDMFD   (sp)!,{r0-r12,pc}
 1440
 1450 .scroll_on
 1460 STMFD   (sp)!,{r0-r3,link}
 1470 LDR     r14,lands_end
 1480 CMP     r10,r14
 1490 LDMEQFD (sp)!,{r0-r3,pc}
 1500 ADR     r0,bank
 1510 AND     r14,r10,#total_rows-1
 1520 RSB     r14,r14,#total_rows-1
 1530 MOV     r1,#bytes_per_row
 1540 MLA     r0,r1,r14,r0
 1550 ADD     r1,r10,#total_rows
 1560 LDR     r2,land_addr
 1570 LDR     r3,spr_addr
 1580 BL      show_row
 1590 ADD     r10,r10,#1
 1600 LDMFD   (sp)!,{r0-r3,pc}
 1610
 1620 .copy_bank
 1630 STMFD   (sp)!,{r0-r12,link}
 1640 RSB     r9,r10,#0
 1650 AND     r9,r9,#total_rows-1
 1660 LDR     r10,vdu_o
 1670 ADR     r11,bank
 1680 MOV     r14,#bytes_per_row
 1690 MLA     r11,r9,r14,r11
 1700 MOV     r8,#total_rows
 1710 .copy_loop
 1720 ]:FOR z%=1 TO bytes_per_row DIV 32
:[OPT pass%
 1730 LDMIA   r11!,{r0-r7}
 1740 STMIA   r10!,{r0-r7}
 1750 ]:NEXT z%:[OPT pass%
 1760 ADD     r9,r9,#1
 1770 ANDS    r9,r9,#total_rows-1
 1780 SUBEQ   r11,r11,#screen_size
 1790 SUBS    r8,r8,#1
 1800 BNE     copy_loop
 1810 LDMFD   (sp)!,{r0-r12,pc}
 1820
 1830 .lands_end      EQUD    land_ext-t
otal_rows
 1840 .spr_addr       EQUD    scene_spr
 1850 .land_addr      EQUD    land
 1860
 1870 .show_row
 1880 STMFD   (sp)!,{r0-r12,link}
 1890 MOV     r14,r1,LSR #FNlog2(size)
 1900 AND     r11,r1,#size-1
 1910 RSB     r11,r11,#size-1
 1920 MOV     r12,#no
 1930 MLA     r2,r14,r12,r2
 1940 ADD     r2,r2,#no-1
 1950 .show_row_loop1
 1960 LDRB    r4,[r2],#-1
 1970 LDR     r4,[r3,r4,LSL #2]
 1980 LDR     r14,[r4,#32]
 1990 ADD     r4,r4,r14
 2000 MOV     r10,#sprite_width
 2010 MLA     r4,r10,r11,r4
 2020 .show_row_loop2
 2030 LDMIA   r4!,{r5-r6}
 2040 STMIA   r0!,{r5-r6}
 2050 SUBS    r10,r10,#8
 2060 BNE     show_row_loop2
 2070 SUBS    r12,r12,#1
 2080 BNE     show_row_loop1
 2090 LDMFD   (sp)!,{r0-r12,pc}
 2100
 2110 .swap_banks
 2120 STMFD   (sp)!,{r0-r2,link}
 2130 MOV     r0,#19
 2140 SWI     "XOS_Byte"
 2150 MOV     r0,#112
 2160 MOV     r1,r11
 2170 SWI     "XOS_Byte"
 2180 RSB     r11,r11,#3
 2190 MOV     r0,#113
 2200 MOV     r1,r11
 2210 SWI     "XOS_Byte"
 2220 ADR     r0,vdu_i
 2230 ADR     r1,vdu_o
 2240 SWI     "XOS_ReadVduVariables"
 2250 LDMFD   (sp)!,{r0-r2,pc}
 2260
 2270 .vdu_i  EQUD    148
 2280 EQUD    -1
 2290 .vdu_o  EQUD    0
 2300 EQUD    0
 2310
 2320 .set_border
 2330 STMFD   (sp)!,{r0-r2,link}
 2340 SWI     "XOS_EnterOS"
 2350 MOV     r2,pc
 2360 MOV     r1,#VIDC
 2370 ORR     r0,r0,#1<<30
 2380 STR     r0,[r1]
 2390 TEQP    r2,#3
 2400 MOVNV   r0,r0
 2410 LDMFD   (sp)!,{r0-r2,pc}
 2420 ]
 2430 routine=FNalloc(128,0)
```

```
2440 bank=FNalloc(screen_size,0)
2450 NEXT pass%
2460 ENDPROC
2470 :
2480 DEF FNalloc(size,align%)
2490 WHILE P% MOD 16<>align%
2500 P%+=4
2510 ENDWHILE
2520 P%+=size
2530 =P%-size
2540 :
2550 DEF FNlog2(a%)=LOG(a%)/LOG(2)
```

Listing 7 – HScapeSlow

```
10 REM >HScapeSlow (GameDes7)
20 REM by Antony Bruce Lytis
30 REM for 32-bit machines
40 REM (c) BAU January 1993
50 :
60 MODE 0
70 OFF
80 DIM land 64*1024,scenery 64*1024,s
cene_spr 4*256
90 !scenery=64*1024
100 scenery!4=0
110 scenery!8=16
120 scenery!12=16
130 *CAT Maps
140 REPEAT
150 INPUT"Which landscape? "land$
160 SYS "XOS_File",5,"Maps."+land$ TO
exists%
170 UNTIL exists%=1
180 PROCload_map(land$)
190 PROCass
200 FOR b=0 TO 3
210 bank_dat!(4*b)=banks+b*screen_size
220 FOR col%=0 TO bytes_per_row STEP 4
230 A%=banks+(screen_size*b)+col%
240 B%=col%+b
250 C%=land
260 D%=scene_spr
270 CALL show_column
280 NEXT
290 NEXT
300 FOR b=0 TO 1
310 MODE mode+128*b
320 PRINTTAB(0,31)"Scrolling landscape
(mode ";mode;")";
330 NEXT
340 IF mode=9 THEN
350 SYS "OS_SpriteOp",&118,scenery,"pa
lette" TO ,,pal_spr
360 pal_dat=pal_spr+44
370 FOR i=0 TO 15
380 a=pal_dat+8*i
390 COLOUR i,a?1,a?2,a?3
400 NEXT
410 ENDIF
420 OFF
430 CALL scroll
440 MODE 0
450 END
460 :
470 DEF PROCload_map(file$)
480 in%=OPENIN("Maps."+file$)
490 x%=0
500 m%=0
510 FOR i=0 TO 255
520 scene_spr!(4*i)=-1
530 NEXT
540 WHILE NOT EOF#in%
550 s$=FNstrip(GET$#in%)
560 IF s$<>"" THEN
570 CASE s$ OF
580 WHEN "Files:":m%=1
590 WHEN "Used:":m%=2
600 WHEN "Map:":m%=3
610 WHEN "Type:":m%=4
620 OTHERWISE
630 CASE m% OF
640 WHEN 1:SYS "OS_SpriteOp",&10B,scen
ery,"Scenery."+s$
650 WHEN 2:
660 i=EVAL("&"+LEFT$(s$,2))
670 s$=FNstrip(MID$(s$,3))
680 SYS "OS_SpriteOp",&118,scenery,s$
TO ,,d%
690 scene_spr!(4*i)=d%
700 IF s$="blank" THEN
710 blnk=i
720 SYS "OS_SpriteOp",&128,scenery,s$
TO ,,,,,,mode
730 ENDIF
740 WHEN 3:
750 dash%=INSTR(s$,"-")
760 IF dash%>0 THEN
770 s1$=LEFT$(s$,dash%-1)
780 s3$=MID$(s$,dash%+1)
790 s2$=RIGHT$("0"+STR$~blnk,2)
800 s$=s1$+STRING$(no-LEN(s1$+s3$)/2,s
2$)+s3$
810 ENDIF
820 a%=land+no*x%
830 FOR i=0 TO no-1
840 a%?i=blnk
850 NEXT
860 y%=no-1
870 WHILE s$<>""
880 a%?y%=EVAL("&"+LEFT$(s$,2))
890 s$=MID$(s$,3)
900 y%-=1
910 ENDWHILE
920 x%+=1
930 WHEN 4:
940 size=VALMID$(s$,2)
950 IF LEFT$(s$,1)="H" THEN
960 IF size=32 total_size=224 ELSE tot
al_size=240
970 ELSE
980 ERROR 17,"Only horizontal landscap
es please!"
990 ENDIF
1000 no=total_size DIV size
1010 ENDCASE
1020 ENDCASE
1030 ENDIF
1040 ENDWHILE
1050 SYS "OS_ReadModeVariable",mode,6 T
O ,,bytes_per_row
1060 screen_size=total_size*bytes_per_r
ow
1070 IF mode=9 sprite_width=size DIV 2
ELSE sprite_width=size
1080 land_ext=x%*sprite_width
1090 FOR i=0 TO 255
1100 IF scene_spr!(4*i)=-1 THEN scene_s
pr!(4*i)=blnk
1110 NEXT
1120 CLOSE#in%
1130 ENDPROC
1140 :
1150 DEF FNstrip(s$)
1160 WHILE LEFT$(s$,1)=" "
1170 s$=MID$(s$,2)
1180 ENDWHILE
1190 WHILE RIGHT$(s$)=" "
1200 s$=LEFT$(s$)
1210 ENDWHILE
1220 =s$
1230 :
1240 DEF PROCass
1250 DIM code% &800+4*screen_size
1260 sp=13:link=14:pc=15
1270 VIDC=&3400000
1280 FOR pass%=0 TO 2 STEP 2
1290 P%=code%
1300 [OPT pass%
1310 .scroll  STMFD   (sp)!,{r0-r12,lin
k}
1320 MOV      r11,#1 ; bank number
1330 MOV      r10,#0 ; position
1340 MOV      r9,#0  ; sub-position
1350 .sloop  BL      swap_banks
1360 MOV      r0,#&F00
1370 BL       set_border
1380 BL       copy_bank
1390 MOV      r0,#&0F0
1400 BL       set_border
1410 BL       scroll_on
1420 MOV      r0,#&000
1430 BL       set_border
1440 SWI      "XOS_ReadEscapeState"
1450 BCC      sloop
1460 MOV      r0,#126
1470 SWI      "XOS_Byte"
1480 LDMFD    (sp)!,{r0-r12,pc}
1490
1500 .scroll_on
1510 STMFD    (sp)!,{r0-r7,link}
1520 LDR      r14,lands_end
1530 CMP      r10,r14
1540 LDMGEFD (sp)!,{r0-r7,pc}
1550 AND      r0,r10,#3
1560 ADR      r1,bank_dat
1570 LDR      r0,[r1,r0,LSL #2]
1580 BIC      r1,r9,#3
1590 ADD      r0,r0,r1
1600 ADD      r1,r10,#bytes_per_row
1610 LDR      r2,land_addr
1620 LDR      r3,spr_addr
1630 BL       show_column
1640 ADD      r9,r9,#1
1650 CMP      r9,#bytes_per_row
1660 MOVEQ    r9,#0
1670 ADD      r10,r10,#1
1680 LDMFD    (sp)!,{r0-r7,pc}
1690
1700 .lands_end       EQUD    land_ext-b
ytes_per_row-16
1710 .spr_addr        EQUD    scene_spr
1720 .land_addr       EQUD    land
1730
1740 .show_column
1750 STMFD    (sp)!,{r0-r12,link}
1760 MOV      r14,r1,LSR #FNlog2(sprite_
width)
1770 AND      r8,r1,#sprite_width-1
1780 MOV      r6,#no
1790 MLA      r7,r14,r6,r2
1800 .show_col1
1810 LDRB     r9,[r7],#1
1820 LDR      r9,[r3,r9,LSL #2]
1830 LDR      r14,[r9,#32]
1840 ADD      r9,r9,r14
1850 BIC      r14,r8,#3
1860 ADD      r9,r9,r14
1870 CMP      r8,#sprite_width-4
1880 ADDLT    r10,r9,#4
1890 LDRGEB   r10,[r7,#no-1]
1900 LDRGE    r10,[r3,r10,LSL #2]
1910 LDRGE    r14,[r10,#32]
1920 ADDGE    r10,r10,r14
1930 AND      r14,r1,#3
1940 MOV      r14,r14,LSL #3
1950 RSB      r4,r14,#32
1960 ]:FOR z%=0 TO size-1:[OPT pass%
1970 LDR      r11,[r9],#sprite_width
1980 LDR      r12,[r10],#sprite_width
1990 MOV      r11,r11,LSR r14
2000 ORR      r11,r11,r12,LSL r4
2010 STR      r11,[r0],#bytes_per_row
2020 ]:NEXT z%:[OPT pass%
2030 SUBS     r6,r6,#1
2040 BNE      show_col1
2050 LDMFD    (sp)!,{r0-r12,pc}
2060 ]
2070 bank_dat=FNalloc(16,0)
2080 [OPT pass%
2090 .copy_bank
2100 STMFD    (sp)!,{r0-r12,link}
2110 AND      r0,r10,#3
2120 ADR      r1,bank_dat
2130 LDR      r10,[r1,r0,LSL #2]
2140 BIC      r9,r9,#3
2150 ADD      r10,r10,r9
2160 LDR      r11,vdu_o
2170 MOV      r8,#total_size
2180 .copy_loop1
2190 MOV      r6,#bytes_per_row
2200 MOV      r7,r9
2210 .copy_loop2
2220 LDR      r0,[r10],#4
2230 STR      r0,[r11],#4
2240 ADD      r7,r7,#4
2250 CMP      r7,#bytes_per_row
2260 SUBEQ    r10,r10,#bytes_per_row
2270 SUBS     r6,r6,#4
2280 BNE      copy_loop2
2290 ADD      r10,r10,#bytes_per_row
2300 SUBS     r8,r8,#1
2310 BNE      copy_loop1
2320 LDMFD    (sp)!,{r0-r12,pc}
2330
2340 .swap_banks
2350 STMFD    (sp)!,{r0-r2,link}
2360 MOV      r0,#19
2370 SWI      "XOS_Byte"
2380 MOV      r0,#112
2390 MOV      r1,r11
2400 SWI      "XOS_Byte"
2410 RSB      r11,r11,#3
2420 MOV      r0,#113
2430 MOV      r1,r11
2440 SWI      "XOS_Byte"
2450 ADR      r0,vdu_i
2460 ADR      r1,vdu_o
2470 SWI      "XOS_ReadVduVariables"
2480 LDMFD    (sp)!,{r0-r2,pc}
2490
2500 .vdu_i  EQUD    148
2510 EQUD    -1
2520 .vdu_o  EQUD    0
2530 EQUD    0
2540
2550 .set_border
2560 STMFD    (sp)!,{r0-r2,link}
2570 SWI      "XOS_EnterOS"
2580 MOV      r2,pc
2590 MOV      r1,#VIDC
2600 ORR      r0,r0,#1<<30
2610 STR      r0,[r1]
2620 TEQP     r2,#3
2630 MOVNV    r0,r0
2640 LDMFD    (sp)!,{r0-r2,pc}
2650 ]
2660 banks=FNalloc(4*screen_size,0)
2670 NEXT pass%
2680 ENDPROC
2690 :
2700 DEF FNalloc(size,align%)
2710 WHILE P% MOD 16<>align%
2720 P%+=4
2730 ENDWHILE
2740 P%+=size
2750 =P%-size
2760 :
2770 DEF FNlog2(a%)=LOG(a%)/LOG(2)
```

Listing 8 – HScapeFast

```
10 REM >HScapeFast (GameDes8)
20 REM by Antony Bruce Lytis
30 REM for 32 bit machines
40 REM (c) BAU January 1993
50 :
60 MODE 0
70 OFF
80 DIM land 64*1024,scenery 64*1024,s
cene_spr 4*256
90 !scenery=64*1024
100 scenery!4=0
110 scenery!8=16
120 scenery!12=16
130 *CAT Maps
140 REPEAT
150 INPUT"Which landscape? "land$
160 SYS "XOS_File",5,"Maps."+land$ TO
exists%
170 UNTIL exists%=1
180 PROCload_map(land$)
190 PROCass
200 FOR b=0 TO 3
210 bank_dat!(4*b)=banks+b*screen_size
220 FOR col%=0 TO bytes_per_row STEP 4
230 A%=banks+(screen_size*b)+col%
240 B%=col%+b
250 C%=land
260 D%=scene_spr
270 CALL show_column
280 NEXT
290 NEXT
300 FOR b=0 TO 1
310 MODE mode+128*b
320 PRINTTAB(0,31)"Scrolling landscape
(mode ";mode;")";
330 NEXT
340 IF mode=9 THEN
350 SYS "OS_SpriteOp",&118,scenery,"pa
lette" TO ,,pal_spr
360 pal_dat=pal_spr+44
370 FOR i=0 TO 15
380 a=pal_dat+8*i
390 COLOUR i,a?1,a?2,a?3
400 NEXT
410 ENDIF
420 OFF
430 CALL scroll
440 MODE 0
450 END
460 :
470 DEF PROCload_map(file$)
480 in%=OPENIN("Maps."+file$)
490 x%=0
500 m%=0
510 FOR i=0 TO 255
520 scene_spr!(4*i)=-1
530 NEXT
540 WHILE NOT EOF#in%
550 s$=FNstrip(GET$#in%)
560 IF s$<>"" THEN
570 CASE s$ OF
580 WHEN "Files:":m%=1
590 WHEN "Used:":m%=2
600 WHEN "Map:":m%=3
610 WHEN "Type:":m%=4
620 OTHERWISE
630 CASE m% OF
640 WHEN 1:SYS "OS_SpriteOp",&10B,scen
ery,"Scenery."+s$
650 WHEN 2:
660 i=EVAL("&"+LEFT$(s$,2))
670 s$=FNstrip(MID$(s$,3))
680 SYS "OS_SpriteOp",&118,scenery,s$
TO ,,d%
690 scene_spr!(4*i)=d%
700 IF s$="blank" THEN
710 blnk=i
720 SYS "OS_SpriteOp",&128,scenery,s$
TO ,,,,,,mode
730 ENDIF
740 WHEN 3:
750 dash%=INSTR(s$,"-")
760 IF dash%>0 THEN
770 s1$=LEFT$(s$,dash%-1)
780 s3$=MID$(s$,dash%+1)
790 s2$=RIGHT$("0"+STR$~blnk,2)
800 s$=s1$+STRING$(no-LEN(s1$+s3$)/2,s
2$)+s3$
810 ENDIF
820 a%=land+no*x%
830 FOR i=0 TO no-1
840 a%?i=blnk
850 NEXT
860 y%=no-1
870 WHILE s$<>""
880 a%?y%=EVAL("&"+LEFT$(s$,2))
890 s$=MID$(s$,3)
900 y%-=1
910 ENDWHILE
920 x%+=1
930 WHEN 4:
940 size=VALMID$(s$,2)
950 IF LEFT$(s$,1)="H" THEN
960 IF size=32 total_size=224 ELSE tot
al_size=240
970 ELSE
980 ERROR 17,"Only horizontal landscap
es please!"
990 ENDIF
1000 no=total_size DIV size
1010 ENDCASE
1020 ENDCASE
1030 ENDIF
1040 ENDWHILE
1050 SYS "OS_ReadModeVariable",mode,6 T
O ,,bytes_per_row
1060 screen_size=total_size*bytes_per_r
ow
1070 IF mode=9 sprite_width=size DIV 2
ELSE sprite_width=size
1080 land_ext=x%*sprite_width
1090 FOR i=0 TO 255
1100 IF scene_spr!(4*i)=-1 THEN scene_s
pr!(4*i)=blnk
1110 NEXT
1120 CLOSE#in%
1130 ENDPROC
1140 :
1150 DEF FNstrip(s$)
1160 WHILE LEFT$(s$,1)=" "
1170 s$=MID$(s$,2)
1180 ENDWHILE
1190 WHILE RIGHT$(s$)=" "
1200 s$=LEFT$(s$)
1210 ENDWHILE
1220 =s$
1230 :
1240 DEF PROCass
1250 DIM code% &800+4*screen_size
1260 sp=13:link=14:pc=15
1270 VIDC=&3400000
1280 FOR pass%=0 TO 2 STEP 2
1290 P%=code%
1300 [OPT pass%
1310 .scroll  STMFD   (sp)!,{r0-r12,lin
k}
1320 MOV      r11,#1 ; bank number
1330 MOV      r10,#0 ; position
1340 MOV      r9,#0  ; sub-position
1350 .sloop  BL      swap_banks
```

```
1360 MOV     r0,#&F00
1370 BL      set_border
1380 BL      copy_bank
1390 MOV     r0,#&0F0
1400 BL      set_border
1410 BL      scroll_on
1420 MOV     r0,#&000
1430 BL      set_border
1440 SWI     "XOS_ReadEscapeState"
1450 BCC     sloop
1460 MOV     r0,#126
1470 SWI     "XOS_Byte"
1480 LDMFD   (sp)!,{r0-r12,pc}
1490
1500 .scroll_on
1510 STMFD   (sp)!,{r0-r7,link}
1520 LDR     r14,lands_end
1530 CMP     r10,r14
1540 LDMGEFD (sp)!,{r0-r7,pc}
1550 AND     r0,r10,#3
1560 ADR     r1,bank_dat
1570 LDR     r0,[r1,r0,LSL #2]
1580 BIC     r1,r9,#3
1590 ADD     r0,r0,r1
1600 ADD     r1,r10,#bytes_per_row
1610 LDR     r2,land_addr
1620 LDR     r3,spr_addr
1630 BL      show_column
1640 ADD     r9,r9,#1
1650 CMP     r9,#bytes_per_row
1660 MOVEQ   r9,#0
1670 ADD     r10,r10,#1
1680 LDMFD   (sp)!,{r0-r7,pc}
1690
1700 .lands_end      EQUD     land_ext-b
ytes_per_row-16
1710 .spr_addr       EQUD     scene_spr
1720 .land_addr      EQUD     land
1730
1740 .show_column
1750 STMFD   (sp)!,{r0-r12,link}
1760 MOV     r14,r1,LSR #FNlog2(sprite_
width)
1770 AND     r8,r1,#sprite_width-1
1780 MOV     r6,#no
1790 MLA     r7,r14,r6,r2
1800 .show_col1
1810 LDRB    r9,[r7],#1
1820 LDR     r9,[r3,r9,LSL #2]
1830 LDR     r14,[r9,#32]
1840 ADD     r9,r9,r14
1850 BIC     r14,r8,#3
1860 ADD     r9,r9,r14
1870 CMP     r8,#sprite_width-4
1880 ADDLT   r10,r9,#4
1890 LDRGEB  r10,[r7,#no-1]
1900 LDRGE   r10,[r3,r10,LSL #2]
1910 LDRGE   r14,[r10,#32]
1920 ADDGE   r10,r10,r14
1930 AND     r14,r1,#3
1940 MOV     r14,r14,LSL #3
1950 RSB     r4,r14,#32
1960 ]:FOR z%=0 TO size-1:[OPT pass%
1970 LDR     r11,[r9],#sprite_width
1980 LDR     r12,[r10],#sprite_width
1990 MOV     r11,r11,LSR r14
2000 ORR     r11,r11,r12,LSL r4
2010 STR     r11,[r0],#bytes_per_row
2020 ]:NEXT z%:[OPT pass%
2030 SUBS    r6,r6,#1
2040 BNE     show_col1
2050 LDMFD   (sp)!,{r0-r12,pc}
2060 ]
2070 bank_dat=FNalloc(16,0)
2080 [OPT pass%
2090 .copy_bank
2100 STMFD   (sp)!,{r0-r12,link}
2110 AND     r0,r10,#3
2120 ADR     r1,bank_dat
2130 LDR     r10,[r1,r0,LSL #2]
2140 BIC     r9,r9,#3
2150 ADD     r10,r10,r9
2160 ADR     r7,routine ; where we're g
oing to assemble our routine
2170 MOV     r8,#bytes_per_row
2180 MVN     r14,#0
2190 ADR     r2,loadi
2200 .make_route
2210 CMP     r8,#0
2220 BEQ     made_route
2230 RSB     r6,r9,#bytes_per_row
2240 CMP     r6,r8
2250 MOVGT   r6,r8
2260 CMP     r6,#40
2270 MOVGT   r6,#40
2280 LDMIA   r2,{r3,r4}
2290 MOV     r0,r6,LSR #2
2300 RSB     r0,r0,#10
2310 AND     r3,r3,r14,LSL r0
2320 AND     r4,r4,r14,LSL r0
2330 STMIA   r7!,{r3,r4}
2340 SUB     r8,r8,r6
2350 ADD     r9,r9,r6
2360 CMP     r9,#bytes_per_row
2370 LDREQ   r0,subi
2380 STREQ   r0,[r7],#4
2390 MOVEQ   r9,#0
2400 B       make_route
2410 .made_route
2420 ADR     r2,add10
2430 LDMIA   r2,{r3-r6}
2440 ADR     r5,routine-16
2450 SUB     r5,r7,r5
2460 MOV     r5,r5,ASR #2
2470 RSB     r5,r5,#0
2480 BIC     r5,r5,#&FF000000
2490 ORR     r5,r5,#&1A000000
2500 STMIA   r7,{r3-r6}
2510 LDR     r11,vdu_o
2520 MOV     r12,#total_size
2530 BL      routine
2540 LDMFD   (sp)!,{r0-r12,pc}
2550
2560 .loadi  LDMIA   r10!,{r0-r9}
2570 STMIA   r11!,{r0-r9}
2580 .subi   SUB     r10,r10,#bytes_per
_row
2590
2600 .add10  ADD     r10,r10,#bytes_per
_row
2610 SUBS    r12,r12,#1
2620 DCD     0
2630 .reti   MOV     pc,link
2640
2650 .swap_banks
2660 STMFD   (sp)!,{r0-r2,link}
2670 MOV     r0,#19
2680 SWI     "XOS_Byte"
2690 MOV     r0,#112
2700 MOV     r1,r11
2710 SWI     "XOS_Byte"
2720 RSB     r11,r11,#3
2730 MOV     r0,#113
2740 MOV     r1,r11
2750 SWI     "XOS_Byte"
2760 ADR     r0,vdu_i
2770 ADR     r1,vdu_o
2780 SWI     "XOS_ReadVduVariables"
2790 LDMFD   (sp)!,{r0-r2,pc}
2800
2810 .vdu_i  EQUD    148
2820 EQUD    -1
2830 .vdu_o  EQUD    0
2840 EQUD    0
2850
2860 .set_border
2870 STMFD   (sp)!,{r0-r2,link}
2880 SWI     "XOS_EnterOS"
2890 MOV     r2,pc
2900 MOV     r1,#VIDC
2910 ORR     r0,r0,#1<<30
2920 STR     r0,[r1]
2930 TEQP    r2,#3
2940 MOVNV   r0,r0
2950 LDMFD   (sp)!,{r0-r2,pc}
2960 ]
2970 routine=FNalloc(128,0)
2980 banks=FNalloc(4*screen_size,0)
2990 NEXT pass%
3000 ENDPROC
3010 :
3020 DEF FNalloc(size,align%)
3030 WHILE P% MOD 16<>align%
3040 P%+=4
3050 ENDWHILE
3060 P%+=size
3070 =P%-size
3080 :
3090 DEF FNlog2(a%)=LOG(a%)/LOG(2)
```

*INFO

Listing 1 – JulSrc

```
10 REM >JulSrc (Info1)
20 REM Source code for Julia8
30 REM By RTW and MG
40 REM For 8 bit machines only
50 REM (C) BAU January 1993
60 :
70 IF PAGE<>&3000 THEN PAGE=&3000:CHA
IN "JulSrc"
80 MODE 7
90 PRINT "Assembling..."
100 PROCassemble
110 A$="SAVE JulCode 2400 "+STR$~P%
120 PRINT "Saving:"
130 PRINT '"*";A$
140 OSCLI (A$)
150 END
160 :
170 DEF FNmove(from,to)
180 [OPT N%
190 LDA from:STA to
200 LDA from+1:STA to+1
210 LDA from+2:STA to+2
220 LDA from+3:STA to+3
230 ]
240 =N%
250 :
260 DEF FNnegate(mem)
270 FOR offset%=0 TO 3
280 [OPT N%
290 LDA mem+offset%
300 EOR #255
310 ADC #0
320 STA mem+offset%
330 ]
340 NEXT
350 =N%
360 :
370 DEF FNadd(dest,source1,source2)
380 FOR offset%=0 TO 3
390 [OPT N%
400 LDA source1+offset%
410 ADC source2+offset%
420 STA dest+offset%
430 ]
440 NEXT
450 =N%
460 :
470 DEF PROCassemble
480 charset% = &900
490 coltab% = &C00
500 scrlo% = &2400
510 scrhi% = &2500
520 code% = &2600
530 :
540 FOR N%=0 TO 255
550 A%=&3080+(N% DIV 8)*640+(N% AND 7)
560 scrlo%?N% = A% AND 255
570 scrhi%?N% = A% DIV 256
580 NEXT
590 :
600 x = &70
610 y = &71
620 col = &72
630 read = &73
640 write = &75
650 num1 = &77
660 temp = num1
670 num2 = &7B
680 prod = num2
690 sign = &83
700 :
710 sc = &84
720 c1 = &88
730 c2 = &8C
740 xi = &90
750 yi = &94
760 e = &98
770 f = &9C
780 n = &A8
790 :
800 pokexo% = &700
810 pokeyo% = &704
820 pokeiter% = &708
830 pokeres% = &709
840 :
850 DIM loop(32)
860 FOR N%=0 TO 2 STEP 2
870 P%=code%
880 [OPT N%
890 JMP start
900 .showstr
910 LDX #0
920 .showstr2
930 STX x
940 LDA &711,X
950 CMP #13
960 BEQ exitstr
970 LDY #0
980 .search
990 CMP chartab,Y
1000 BEQ gotchar
1010 INY
1020 BNE search
1030 .gotchar
1040 TYA
1050 STA read
1060 LDA #0
1070 ASL read
1080 ROL A
1090 ASL read
1100 ROL A
1110 ASL read
1120 ROL A
1130 ASL read
1140 ROL A
1150 CLC
1160 ADC #(charset% DIV 256)
1170 STA read+1
1180 LDY #15
1190 .charloop
1200 LDA (read),Y
1210 AND &710
1220 STA (write),Y
1230 DEY
1240 BPL charloop
1250 CLC
1260 LDA write
1270 ADC #16
1280 STA write
1290 LDA write+1
1300 ADC #0
1310 STA write+1
1320 LDX x
1330 INX
1340 BNE showstr2
1350 .exitstr
1360 RTS
1370 .chartab
1380 EQUS " 0123456789-=."
1390 EQUS "ABCDEFGHIJKLMN"
1400 EQUS "OPQRSTUVWXYZ"
1410 :
1420 .bigplot
1430 INX
1440 LDY #15
1450 .bigblock
1460 LDA colours,X
1470 STA (write),Y
1480 TXA
1490 EOR #1
1500 TAX
1510 DEY
1520 BPL bigblock
1530 RTS
1540 :
1550 .plot
1560 LDA x
1570 AND #1
1580 BNE righthalf
1590 .lefthalf
1600 LDA colours,X
1610 AND #&AA
1620 STA temp
1630 LDY #0
1640 LDA (write),Y
1650 AND #&55
1660 ORA temp
1670 STA (write),Y
1680 RTS
1690 .righthalf
1700 LDA colours,X
1710 AND #&55
1720 STA temp
1730 LDY #0
1740 LDA (write),Y
1750 AND #&AA
1760 ORA temp
1770 STA (write),Y
1780 RTS
1790 :
1800 .medplot
1810 LDA colours,X
1820 LDY #0
1830 STA (write),Y
1840 INY
1850 INX
1860 LDA colours,X
1870 STA (write),Y
1880 RTS
1890 .colours
1900 EQUD &2F1F3F3F:EQUD &0F0F3E3D
1910 EQUD &2E1D1E1D:EQUD &271B3C3C
1920 EQUD &36390B07:EQUD &19260C0C
1930 EQUD &06093438:EQUD &24183333
1940 EQUD &32311323:EQUD &12210303
1950 EQUD &30300102:EQUD &00001020
1960 :
1970 .multiply
1980 LDA num1+3
1990 EOR num2+3
2000 STA sign
2010 LDA num1+3
2020 BPL num1plus
2030 SEC
2040 OPT FNnegate(num1)
2050 .num1plus
2060 LDA num2+3
2070 BPL num2plus
2080 SEC
2090 OPT FNnegate(num2)
2100 .num2plus
2110 LDA #0
2120 STA prod+4
2130 STA prod+5
2140 STA prod+6
2150 STA prod+7
2160 ]
2170 FOR mult%=0 TO 31
2180 [OPT N%
2190 CLC
2200 LDA prod
2210 AND #1
2220 BEQ loop(mult%)
2230 OPT FNadd(prod+4,num1,prod+4)
2240 .loop(mult%)
2250 ROR prod+7
```

```
2260 ROR prod+6
2270 ROR prod+5
2280 ROR prod+4
2290 ROR prod+3
2300 ROR prod+2
2310 ROR prod+1
2320 ROR prod
2330 ]
2340 NEXT
2350 [OPT N%
2360 LDA sign
2370 BPL resultplus
2380 SEC
2390 OPT FNnegate(prod+2)
2400 .resultplus
2410 RTS
2420 :
2430 .xscale
2440 EQUB 4
2450 EQUB 2
2460 EQUB 1
2470 .yscale
2480 EQUB 8
2490 EQUB 2
2500 EQUB 1
2510 .plottype
2520 EQUW bigplot
2530 EQUW medplot
2540 EQUW plot
2550 :
2560 .start
2570 SEI
2580 ]
2590 FOR offset%=0 TO 3
2600 [OPT N%
2610 LDA pokexo%+offset%
2620 STA xoff+1+6*offset%
2630 LDA pokeyo%+offset%
2640 STA yoff+1+6*offset%
2650 ]
2660 NEXT
2670 [OPT N%
2680 LDA pokeiter%
2690 STA iters+1
2700 LDX pokeres%
2710 LDA xscale,X
2720 STA xpoke+1
2730 LDA yscale,X
2740 STA ypoke+1
2750 TXA
2760 ASL A
2770 TAX
2780 LDA plottype,X
2790 STA showdot+1
2800 LDA plottype+1,X
2810 STA showdot+2
2820 LDA #0
2830 STA x
2840 .outerloop
2850 LDA #0
2860 STA y
2870 .innerloop
2880 :
2890 \ xi=sc*x*2+xo
2900 OPT FNmove(sc,num1)
2910 LDA #0
2920 STA num2
2930 STA num2+1
2940 STA num2+3
2950 LDA x
2960 ASL A
2970 ROL num2+3
2980 STA num2+2
2990 JSR multiply
3000 CLC
3010 LDA prod+2
3020 .xoff
3030 ADC #0
3040 STA xi
3050 LDA prod+3:ADC #0:STA xi+1
3060 LDA prod+4:ADC #0:STA xi+2
3070 LDA prod+5:ADC #0:STA xi+3
3080 :
3090 \ yi=sc*y+yo
3100 OPT FNmove(sc,num1)
3110 LDA #0
3120 STA num2
3130 STA num2+1
3140 STA num2+3
3150 LDA y
3160 STA num2+2
3170 JSR multiply
3180 CLC
3190 LDA prod+2
3200 .yoff
3210 ADC #0
3220 STA yi
3230 LDA prod+3:ADC #0:STA yi+1
3240 LDA prod+4:ADC #0:STA yi+2
3250 LDA prod+5:ADC #0:STA yi+3
3260 :
3270 LDA #255
3280 STA n
3290 .iterate
3300 :
3310 \ f=yi*yi
3320 LDA yi+0:STA num1+0:STA num2+0
3330 LDA yi+1:STA num1+1:STA num2+1
3340 LDA yi+2:STA num1+2:STA num2+2
3350 LDA yi+3:STA num1+3:STA num2+3
3360 JSR multiply
3370 OPT FNmove(prod+2,f)
3380 :
3390 \ e=xi*xi
3400 LDA xi+0:STA num1+0:STA num2+0
3410 LDA xi+1:STA num1+1:STA num2+1
3420 LDA xi+2:STA num1+2:STA num2+2
3430 LDA xi+3:STA num1+3:STA num2+3
3440 JSR multiply
3450 OPT FNmove(prod+2,e)
3460 :
3470 \ yi=2*xi*yi+c2
3480 LDA xi+0:ASL A:STA num1+0
3490 LDA xi+1:ROL A:STA num1+1
3500 LDA xi+2:ROL A:STA num1+2
3510 LDA xi+3:ROL A:STA num1+3
3520 OPT FNmove(yi,num2)
3530 JSR multiply
3540 CLC
3550 OPT FNadd(yi,prod+2,c2)
3560 :
3570 \ xi=e-f+c1
3580 SEC
3590 LDA e+0:SBC f+0:STA xi+0
3600 LDA e+1:SBC f+1:STA xi+1
3610 LDA e+2:SBC f+2:STA xi+2
3620 LDA e+3:SBC f+3:STA xi+3
3630 CLC
3640 OPT FNadd(xi,xi,c1)
3650 :
3660 CLC
3670 LDA n
3680 ADC #1
3690 STA n
3700 .iters
3710 CMP #32
3720 BEQ infinity
3730 CLC
3740 LDA e
3750 ADC f
3760 LDA e+1
3770 ADC f+1
3780 LDA e+2
3790 ADC f+2
3800 STA temp
3810 LDA e+3
3820 ADC f+3
3830 BNE gotdot
3840 LDA temp
3850 CMP #4
3860 BCS gotdot
3870 JMP iterate
3880 .infinity
3890 LDA #1
3900 STA n
3910 .gotdot
3920 :
3930 LDX n
3940 LDA coltab%,X
3950 STA col
3960 LDA #0
3970 STA write+1
3980 LDA x
3990 AND #&FE
4000 ASL A
4010 ROL write+1
4020 ASL A
4030 ROL write+1
4040 CLC
4050 LDY y
4060 ADC scrlo%,Y
4070 STA write
4080 LDA write+1
4090 ADC scrhi%,Y
4100 STA write+1
4110 LDA y
4120 LSR A
4130 ROL col
4140 LDX col
4150 .showdot
4160 JSR plot
4170 CLC
4180 LDA y
4190 .ypoke
4200 ADC #8
4210 STA y
4220 BEQ exit1
4230 JMP innerloop
4240 .exit1
4250 CLC
4260 LDA x
4270 .xpoke
4280 ADC #4
4290 STA x
4300 BMI exit2
4310 JMP outerloop
4320 .exit2
4330 CLI
4340 RTS
4350 ]
4360 NEXT
4370 ENDPROC
```

Listing 2 – Char8

```
   10 REM >CharMk (Info2)
   20 REM Characters of Julia8
   30 REM By RTW and MG
   40 REM For 8 bit machines only
   50 REM (C) BAU January 1993
   60 :
   70 VDU 23,128,&0A0E;&0A0A;&0A0A;&0E;
   80 VDU 23,129,&4ACE;&4E42;&4848;&EE;
   90 VDU 23,130,&AAEA;&6E2A;&A222;&E2;
  100 VDU 23,131,&8AEE;&EE88;&AA2A;&EE;
  110 VDU 23,132,&AAEE;&2E2A;&2A2A;&2E;
  120 VDU 23,133,&A0E0;&EEA0;&A020;&E0;
  130 VDU 23,134,&0000;&00E0;&04E0;&04;
  140 VDU 23,135,&AAEE;&ECAA;&AAAA;&AE;
  150 VDU 23,136,&AAEE;&8A8A;&AA8A;&EC;
  160 VDU 23,137,&88EE;&CC88;&8888;&E8;
  170 VDU 23,138,&AAEA;&AE8A;&AAAA;&EA;
  180 VDU 23,139,&42E2;&4242;&4A42;&EE;
  190 VDU 23,140,&A8A8;&C8A8;&A8A8;&AE;
  200 VDU 23,141,&EAAE;&AAAA;&AAAA;&AA;
  210 VDU 23,142,&AAEE;&AEAA;&A8A8;&E8;
  220 VDU 23,143,&AAEE;&AEAA;&CAAC;&AA;
  230 VDU 23,144,&A4EE;&E484;&A424;&E4;
  240 VDU 23,145,&AAAA;&AAAA;&AAAA;&E4;
  250 VDU 23,146,&AAAA;&A4AA;&EAAA;&AA;
  260 VDU 23,147,&A2AE;&E4A2;&4848;&4E;
  270 :
  280 MODE 2
  290 COLOUR 132
  300 COLOUR 7
  310 FOR N%=128 TO 147
  320 VDU N%
  330 NEXT
  340 :
  350 *SAVE CharSet 3000+280
```

Listing 3 – Jul8

```
   10 REM >Julia8 (Info4)
   20 REM Front end for Julia8
   30 REM By Richard Talbot-Watkins
   40 REM  & Matthew Godbolt
   50 REM For 8 bit machines only
   60 REM (C) BAU January 1993
   70 :
   80 IF PAGE>&1100:PAGE=&1100:CHAIN "Ju
lia8"
   90 MODE 2
  100 VDU 23;8202;0;0;0;
  110 HIMEM=&2400
  120 PROCinit
  130 ON ERROR IF ERR=17 AND NOT INKEY-1
 ELSE MODE 7:REPORT:PRINT " at line ";ER
L:END
  140 CLS
  150 PROCmain
  160 END
  170 :
  180 DEF PROCinit
  190 *Load JulCode 2400
  200 *Load CharSet 900
  210 coltab% = &C00
  220 pokexo% = &700
  230 pokeyo% = &704
  240 pokeiter% = &708
  250 pokeres% = &709
  260 write = &75
  270 pokesc% = &84
  280 pokec1% = &88
  290 pokec2% = &8C
  300 @%=6
  310 file$="JulPicA"
  320 :
  330 FOR N%=8 TO 15
  340 VDU 19,N%,7;0;
  350 NEXT
  360 ?coltab%=23
  370 log=LOG(255)
  380 FOR N%=1 TO 255
  390 N%?coltab% = 23-23*LOGN%/log
  400 NEXT
  410 ENDPROC
  420 :
  430 DEF PROCmain
  440 PROCpanel
  450 mult%=2^16
  460 c1=FNinput(5)
  470 c2=FNinput(8)
  480 xo=-1.375
  490 yo=-1.25
  500 sc=2.5
  510 iter%=32
  520 res%=0
  530 PROCcentre("LOW",23)
  540 :
  550 REPEAT
  560 !pokesc%   = (sc/256)*mult%
  570 !pokec1%   = c1*mult%
  580 !pokec2%   = c2*mult%
  590 !pokexo%   = xo*mult%
  600 !pokeyo%   = yo*mult%
  610 ?pokeiter% = iter%
  620 ?pokeres%  = res%
  630 PROCstatus
  640 CALL &2600
  650 :
  660 x%=0:y%=0:s%=80
  670 PROCrect(x%,y%,s%)
  680 REPEAT
  690 PROCrect(x%,y%,s%)
  700 sp%=4*INKEY-1-1
  710 x%=x%-sp%*(INKEY-98-INKEY-67)
  720 y%=y%-sp%*(INKEY-73-INKEY-105)
  730 s%=s%-3*(INKEY-42-INKEY-58)
  740 IF x%<0 x%=0
  750 IF y%<0 y%=0
  760 IF x%>127-s%/2 x%=127-s%/2
  770 IF y%>255-s% y%=255-s%
  780 IF s%<8 s%=8
  790 IF INKEY-82 PROCsave
  800 PROCrect(x%,y%,s%)
  810 IF INKEY-26 AND iter%>16 iter%=ite
r%-8:PROCcentre(STR$(iter%),20)
  820 IF INKEY-122 AND iter%<248 iter%=i
ter%+8:PROCcentre(STR$(iter%),20)
  830 IF INKEY-87 res%=0:PROCcentre("LOW
",23)
  840 IF INKEY-102 res%=1:PROCcentre("ME
DIUM",23)
  850 IF INKEY-85 res%=2:PROCcentre("HIG
H",23)
  860 redraw%=INKEY-52
  870 UNTIL INKEY-74 OR redraw%
  880 PROCrect(x%,y%,s%)
  890 IF redraw% UNTIL FALSE
  900 xo=xo+((x%/128)*sc)
  910 yo=yo+((y%/256)*sc)
  920 sc=sc*(s%/256)
  930 UNTIL FALSE
  940 END
  950 :
  960 DEF PROCrect(x%,y%,s%)
  970 MOVE x%*8,1023-y%*4
  980 GCOL 3,8
  990 PLOT 25,s%*4,0
 1000 PLOT 25,0,-s%*4
 1010 PLOT 25,-s%*4,0
 1020 PLOT 25,0,s%*4
 1030 ENDPROC
 1040 :
 1050 DEF PROCprint($&711,x%,y%)
 1060 !write=&3000+y%*640+x%*8
 1070 CALL &2603
 1080 ENDPROC
 1090 :
 1100 DEF PROCcentre(text$,y%)
 1110 PROCprint(STRING$(7," "),1,y%)
 1120 PROCprint(text$,8-LEN(text$),y%)
 1130 ENDPROC
 1140 :
 1150 DEF PROCpanel
 1160 VDU 29,0;0;
 1170 VDU 28,0,31,3,0
 1180 COLOUR 132:CLS
 1190 MOVE 255,1023:PLOT 7,255,0
 1200 PLOT 7,0,0
 1210 MOVE 255,4:PLOT 7,8,4
 1220 GCOL 0,6
 1230 MOVE 0,4:DRAW 0,1023
 1240 DRAW 255,1023:MOVE 0,1019
 1250 DRAW 247,1019
 1260 VDU 29,256;0;
 1270 ?&710=&F
 1280 PROCcentre("JULIA",1)
 1290 PROCcentre("SETS",2)
 1300 ?&710=&3C
 1310 PROCcentre("C1 =",4)
 1320 PROCcentre("C2 =",7)
 1330 PROCcentre("X =",10)
 1340 PROCcentre("Y =",13)
 1350 PROCcentre("S =",16)
 1360 PROCcentre("ITER =",19)
 1370 PROCcentre("RESOL =",22)
 1380 PROCcentre("C.1992",25)
 1390 PROCcentre("BAU",26)
 1400 PROCcentre("BY RTW",28)
 1410 PROCcentre("AND MG",29)
 1420 ?&710=&3F
 1430 ENDPROC
 1440 :
 1450 DEF PROCnumber(num,y%)
 1460 PROCprint(STRING$(7," "),1,y%)
 1470 PROCprint(STR$(num),8-LENSTR$(num)
,y%)
```

```
1480 ENDPROC
1490 :
1500 DEF PROCstatus
1510 @%=&1020406
1520 PROCnumber(c1,5)
1530 PROCnumber(c2,8)
1540 PROCnumber(xo,11)
1550 PROCnumber(yo,14)
1560 PROCnumber(sc,17)
1570 @%=6
1580 PROCcentre(STR$(iter%),20)
1590 ENDPROC
1600 :
1610 DEF FNinput(y%)
1620 LOCAL num$
1630 PROCprint(STRING$(7,"."),1,y%)
1640 REPEAT
1650 REPEAT
1660 A$=GET$
1670 UNTIL INSTR("0123456789-."+CHR$127
+CHR$13,A$)
1680 IF A$<>CHR$127 AND A$<>CHR$13 AND
LEN(num$)<7 num$=num$+A$
1690 IF A$=CHR$127 AND num$<>"" num$=LE
FT$(num$,LEN(num$)-1)
1700 IF A$<>CHR$13 PROCcentre(num$,y%)
1710 UNTIL A$=CHR$13
1720 =VAL(num$)
1730 :
1740 DEF PROCsave
1750 OSCLI "SAVE "+file$+" 3000+5000"
1760 file$=LEFT$(file$,6)+CHR$(1+ASC(RI
GHT$(file$,1)))
1770 ENDPROC
```

Listing 4 – !Runimage

```
10 REM >!RunImage (Info5)
20 REM Mine game
30 REM by D Walters & A Fawcett
40 REM for 32-bit machines
50 REM (c) BAU January 1993
60 :
70 DIM q% 255, b% 255, ic% 255
80 ON ERROR PROCerror(ERR,REPORT$)
90 PROCinitheap
100 PROCinit_task("Mine")
110 PROCload_sprites
120 PROCload_templates
130 PROCload_menus
140 PROCinit_game
150 PROCcreate_game_window
160 PROCstart_game(FALSE)
170 ON ERROR PROCerror(ERR,REPORT$)
180 PROCwimp_poll(0)
190 END
200 :
210 DEF PROCopen_window(q%)
220 SYS &400C5,,q%
230 ENDPROC
240 :
250 DEF PROCclose_window
260 win_ptr%=FNwin_hand_ptr(q%!0)
270 IF win_ptr%<>0 THEN
280 SYS &400CB,,q%
290 SYS &400C6,,q%
300 PROCcopy_block(q%+4,win_ptr%!16,32
)
310 win_ptr%!24=0
320 ELSE
330 SYS &400C6,,q%
340 ENDIF
350 IF $win_ptr%="main" PROCclosedown
360 ENDPROC
370 :
380 DEF PROCpointer_entering
390 SYS "OS_SpriteOp",36+256,IconSpr,"
sight",1,11,5
400 ENDPROC
410 :
420 DEF PROCpointer_leaving
430 SYS "OS_SpriteOp",36+256,IconSpr,"
ptr_default",1
440 ENDPROC
450 :
460 DEF PROCmouse_click(but%,win%,icon
%)
470 IF win%=-2 win$="bar"
480 IF win%>0 win$=$(FNwin_hand_ptr(wi
n%))
490 CASE win$ OF
500 WHEN "main":
510 CASE but% OF
520 WHEN 1,4:
530 IF icon%>=8 AND done%=FALSE THEN
540 x%=(icon%-8) MOD cols
550 y%=(icon%-8) DIV cols
560 IF but%=1 AND state%(x%,y%)>=0 THE
N
570 state%(x%,y%)=(state%(x%,y%)+1) MO
D 3
580 CASE state%(x%,y%) OF
590 WHEN 0:PROCset_icon(win%,icon%,"bl
ock")
600 WHEN 1:PROCset_icon(win%,icon%,"fl
ag"):left%-=1
610 WHEN 2:PROCset_icon(win%,icon%,"?"
):left%+=1
620 ENDCASE
630 PROCbomb_left
640 IF left%=0 THEN
650 PROCend
660 IF wrong%>0 THEN
670 ok=FNdialog("Oh dear!, "+STR$wrong
%+" Wrongly placed flag(s)!",0)
680 ELSE
690 ok=FNdialog("Well Done!, you have
safely defused all mines!",0)
700 ENDIF
710 ENDIF
720 ENDIF
730 IF but%=4 AND state%(x%,y%)=0 THEN
740 bomb%=FNa(x%,y%,0)
750 IF bomb%=-100 THEN
760 PROCset_icon(win%,icon%,"mine")
770 VDU 7
780 PROCend
790 ok=FNdialog("Bad Luck!, You Hit a
Mine!",0)
800 ENDIF
810 ENDIF
820 ENDIF
830 WHEN 2:PROCcreate_menu(win$,q%!0,q
%!4)
840 ENDCASE
850 WHEN "start":
860 IF (but% AND 5)>0 THEN
870 CASE icon% OF
880 WHEN 9:IF new_cols>10 new_cols-=1
890 WHEN 10:IF new_rows>4 new_rows-=1
900 WHEN 11:IF new_bombs>1 new_bombs-=
1
910 WHEN 12:IF new_cols<max_cols new_c
ols+=1
920 WHEN 13:IF new_rows<max_rows new_r
ows+=1
930 WHEN 14:new_bombs+=1
940 WHEN 5:
950 IF bombs%<>new_bombs OR cols<>new_
cols OR rows<>new_rows THEN
960 bombs%=new_bombs
970 cols=new_cols
980 rows=new_rows
990 PROCcreate_game_window
1000 ENDIF
1010 PROCstart_game(TRUE)
1020 IF but%<>1 SYS "Wimp_CreateMenu",,
-1
1030 ENDCASE
1040 PROCrefresh_start_win
1050 ENDIF
1060 ENDCASE
1070 ENDPROC
1080 :
1090 DEF PROCmenu_selection
1100 LOCAL i,from$
1110 SYS "Wimp_DecodeMenu",,this_menu%,
q%,b%
1120 FOR i=0 TO 10
1130 IF menu%(i)=this_menu% from$=menu$
(i)
1140 NEXT
1150 IF from$="main" THEN
1160 CASE $b% OF
1170 WHEN "Start Game":
1180 PROCstart_game(TRUE)
1190 WHEN "Quit":PROCclosedown
1200 ENDCASE
1210 ENDIF
1220 IF FNmouse_button=1 SYS "Wimp_Crea
teMenu",,this_menu%
1230 ENDPROC
1240 :
1250 DEF PROCreceive
1260 CASE q%!16 OF
1270 WHEN 0:PROCclosedown
1280 WHEN &400C0:
1290 IF q%!20>=menp% THEN
1300 SYS "Wimp_CreateSubMenu",,q%!20,q%
!24,q%!28
1310 ELSE
1320 PROCcreate_window($(q%!20),0)
1330 IF $(q%!20)="start" THEN
1340 new_cols=cols
1350 new_rows=rows
1360 new_bombs=bombs%
1370 PROCrefresh_start_win
1380 ENDIF
1390 SYS "Wimp_CreateSubMenu",,win_ptr%
!24,q%!24,q%!28
1400 ENDIF
1410 ENDCASE
1420 ENDPROC
1430 :
1440 DEF PROCrefresh_start_win
1450 LOCAL win_ptr%
1460 win_ptr%=FNwin_name_ptr("start")
1470 IF new_bombs>new_rows*new_cols THE
N new_bombs=new_rows*new_cols
1480 PROCset_icon(win_ptr%!24,6,STR$(ne
w_cols))
1490 PROCset_icon(win_ptr%!24,7,STR$(ne
w_rows))
1500 PROCset_icon(win_ptr%!24,8,STR$(ne
w_bombs))
1510 ENDPROC
1520 :
1530 DEF PROCload_sprites
1540 SYS "OS_File",5,alias$+".Sprites"
TO ,,,,len%:len%+=16
1550 DIM IconSpr len%
1560 !IconSpr=len%
1570 IconSpr!4=0
1580 IconSpr!8=16
1590 IconSpr!12=16
1600 SYS "OS_SpriteOp",10+256,IconSpr,a
lias$+".Sprites"
1610 ENDPROC
1620 :
1630 DEF PROCset_icon(window%,icon%,s$)
1640 ic%!0=window%
1650 ic%!4=icon%
1660 SYS "Wimp_GetIconState",,ic%
1670 IF $(ic%+28)<>s$ THEN
1680 $(ic%+28)=s$
1690 SYS "Wimp_DeleteIcon",,ic%
1700 ic%!4=window%
1710 SYS "Wimp_CreateIcon",,ic%+4 TO ic
on%
1720 ic%!0=window%
1730 ic%!4=icon%
1740 ic%!8=0
1750 ic%!12=0
1760 SYS "Wimp_SetIconState",,ic%
1770 ENDIF
1780 ENDPROC
1790 :
1800 DEF PROCreset_icons(ic%!0,ic%!4)
1810 SYS &400CE,,ic%
1820 $(ic%+28)="block"
1830 SYS &400C4,,ic%
1840 ic%!4=ic%!0
1850 SYS &400C2,,ic%+4
1860 ENDPROC
1870 :
1880 DEF PROCbomb_left
1890 ic%!0=win%
1900 ic%!4=2
1910 SYS &400CE,,ic%
1920 $(ic%+28)=STRING$(2-LEN(STR$left%)
,"0")+STR$left%
1930 SYS &400C4,,ic%
1940 ic%!4=ic%!0
1950 SYS &400C2,,ic%+4
1960 ic%!8=2
1970 ic%!12=0
1980 ic%!16=0
1990 SYS &400CD,,ic%+4
2000 ENDPROC
2010 :
2020 DEF PROCinit_game
2030 max_cols=30
2040 max_rows=20
2050 cols=20
2060 rows=10
2070 bombs%=15
2080 DIM grid%(max_cols,max_rows)
2090 DIM gnum%(max_cols,max_rows)
2100 DIM state%(max_cols,max_rows)
2110 z%=RND(-TIME)
2120 ENDPROC
2130 :
2140 DEF PROCstart_game(redraw%)
2150 left%=bombs%
2160 done%=FALSE
2170 grid%()=0
2180 gnum%()=0
2190 state%()=0
2200 FOR i%=1 TO bombs%
2210 REPEAT
2220 x%=RND(cols)-1
2230 y%=RND(rows)-1
2240 UNTIL grid%(x%,y%)=0
2250 grid%(x%,y%)=1
2260 NEXT
2270 win%=FNwin_hand("main")
2280 PROCbomb_left
2290 FOR i%=8 TO 8+rows*cols-1
2300 PROCreset_icons(win%,i%)
2310 NEXT
2320 IF redraw% THEN SYS "Wimp_ForceRed
raw",win%,0,-2000,2000,0
2330 ENDPROC
2340 :
2350 DEF FNa(xx%,yy%,f%)
2360 LOCAL count%,i%,j%
2370 IF xx%<0 OR xx%>=cols OR yy%<0 OR
yy%>=rows OR state%(xx%,yy%)<>0 THEN =-1
2380 IF f%=0 THEN gnum%()=0
2390 IF grid%(xx%,yy%)=1 AND f%=0 THEN
=-100
2400 count%=FNc(xx%,yy%)
2410 IF count%=0 THEN
2420 PROCset_icon(win%,yy%*cols+xx%+8,"
clear")
2430 state%(xx%,yy%)=-1
2440 FOR i%=xx%-1 TO xx%+1
2450 FOR j%=yy%-1 TO yy%+1
2460 IF i%>=0 AND i%<cols AND j%>=0 AND
j%<rows THEN
2470 IF NOT(i%=xx% AND j%=yy%) AND gnum
%(i%,j%)=0 THEN
2480 gnum%(i%,j%)=1
2490 count%=FNa(i%,j%,1)
2500 ENDIF
2510 ENDIF
2520 NEXT
2530 NEXT
2540 ELSE
2550 PROCset_icon(win%,yy%*cols+xx%+8,S
TR$count%)
2560 state%(xx%,yy%)=-1
2570 ENDIF
2580 =count%
2590 :
2600 DEF FNc(xxx%,yyy%)
2610 LOCAL x1%,y1%,c%
2620 c%=0
2630 FOR x1%=xxx%-1 TO xxx%+1
2640 FOR y1%=yyy%-1 TO yyy%+1
2650 IF NOT(x1%=xxx% AND y1%=yyy%) THEN
2660 IF x1%>=0 AND x1%<cols AND y1%>=0
AND y1%<rows THEN
2670 c%+=grid%(x1%,y1%)
2680 ENDIF
2690 ENDIF
2700 NEXT
2710 NEXT
2720 =c%
2730 :
2740 DEF PROCend
2750 wrong%=0
2760 FOR icon%=8 TO 8+(rows*cols)-1
2770 x%=(icon%-8) MOD cols
2780 y%=(icon%-8) DIV cols
2790 IF state%(x%,y%)=1 AND grid%(x%,y%
)=0 THEN
2800 PROCset_icon(win%,icon%,"wrong")
2810 wrong%+=1
2820 ENDIF
2830 IF state%(x%,y%)=0 AND grid%(x%,y%
)=1 PROCset_icon(win%,icon%,"mine")
2840 NEXT
2850 done%=TRUE
2860 ENDPROC
2870 :
2880 DEF PROCbar_icon($(q%+24))
2890 !q%=-1
2900 q%!4=0
2910 q%!8=0
2920 q%!12=68
2930 q%!16=68
2940 q%!20=&3002
2950 SYS &400C2,,q%
2960 ENDPROC
2970 :
2980 DEF PROCclosedown
2990 SYS &400DD
3000 END
3010 ENDPROC
3020 :
3030 DEF PROCcreate_menu(m$,x%,y%)
3040 LOCAL i%,m%
3050 FOR i%=0 TO 10
3060 IF menu$(i%)=m$ m%=menu%(i%)
3070 NEXT
3080 SYS &400D4,,m%,x%-64,y%
3090 this_menu%=m%
3100 this_menu$=m$
3110 ENDPROC
3120 :
3130 DEF FNdialog(m$,f%)
3140 LOCAL q%,b%
3150 q%=FNgetablock(256)
3160 q%!0=0
3170 $(q%+4)=m$
3180 f%=f% OR %10001
3190 SYS &400DF,q%,f%,task$ TO ,b%
3200 PROCfreeablock(q%)
3210 =b%
3220 :
3230 DEF PROCerror(!err_blk%,mess$)
3240 LOCAL b%
3250 mess$+=(" (internal error code "+S
TR$ERL+")")
3260 $(err_blk%+4)=mess$
3270 SYS "Wimp_ReportError",err_blk%,3,
task$ TO ,b%
```

```
3280 IF b%=2 PROCclosedown
3290 ENDPROC
3300 :
3310 DEF PROCfreeablock(RETURN loc%)
3320 IF loc%>0 THEN SYS &1D,3,heapd%,loc%
3330 loc%=-1
3340 ENDPROC
3350 :
3360 DEF FNgetablock(size%)
3370 LOCAL loc%,ok%,heapfull%,largest%
3380 heapfull%=FALSE
3390 REPEAT
3400 SYS &1D,1,heapd% TO ,,largest%
3410 IF largest%>=size% THEN
3420 SYS "OS_Heap",2,heapd%,,size% TO ,,loc%
3430 ok%=TRUE
3440 ELSE
3450 heapfull%=FNtrytoextendheap
3460 ENDIF
3470 UNTIL ok% OR heapfull%
3480 IF heapfull% THEN ERROR 17,"Could Not Get Block"
3490 =loc%
3500 :
3510 DEF FNget_line(f%)
3520 IF NOT(EOF#f%) THEN =GET$#f% ELSE =""
3530 :
3540 DEF PROCinitheap
3550 heapd%=HIMEM
3560 heapsize%=32*1024
3570 SYS "Wimp_SlotSize",-1,-1 TO appsize%
3580 SYS "Wimp_SlotSize",appsize%+heapsize%,-1
3590 SYS &1D,0,heapd%,,heapsize%
3600 ENDPROC
3610 :
3620 DEF PROCinit_task(t$)
3630 LOCAL t%
3640 DIM t% 12, err_blk% 255
3650 $t%="TASK"
3660 SYS &400C0,200,!t%,t$
3670 alias$="<Mine$Dir>"
3680 task$=t$
3690 ENDPROC
3700 :
3710 DEF FNtrytoextendheap
3720 LOCAL heapfull%,new%
3730 SYS "XWimp_SlotSize",appsize%+heapsize%+32*1024,-1 TO ,new%;heapfull%
3740 heapfull%=((heapfull% AND 1)=1)
3750 IF new%=appsize%+heapsize% THEN heapfull%=TRUE
3760 IF NOT heapfull% THEN
3770 heapsize%+=32*1024
3780 SYS &1D,5,heapd%,,32*1024
3790 ENDIF
3800 =heapfull%
3810 :
3820 DEF PROCwimp_poll(mask%)
3830 LOCAL r%
3840 REPEAT
3850 SYS &400C7,mask%,q% TO r%
3860 IF r% PROCaction(r%)
3870 UNTIL FALSE
3880 ENDPROC
3890 :
3900 DEF PROCaction(r%)
3910 CASE r% OF
3920 WHEN 2:PROCopen_window(q%)
3930 WHEN 3:PROCclose_window
3940 WHEN 4:PROCpointer_leaving
3950 WHEN 5:PROCpointer_entering
3960 WHEN 6:PROCmouse_click(q%!8,q%!12,q%!16)
3970 WHEN 9:PROCmenu_selection
3980 WHEN 17,18:PROCreceive
3990 ENDCASE
4000 ENDPROC
4010 :
4020 DEF PROCload_templates
4030 LOCAL f%,n%,off%,ind%,win%,winsize%,indsize%
4040 LOCAL start%,end%,pos%,i%,win_loc%,w%
4050 LOCAL found%,size%
4060 DIM w% 4
4070 SYS "OS_File",5,alias$+".Templates" TO found%,,,,size%
4080 IF found% THEN
4090 f%=OPENIN(alias$+".Templates")
4100 PTR#f%=16
4110 n%=0
4120 ind%=0
4130 WHILE FNget_word(f%)
4140 PTR#f%=PTR#f%+20
4150 n%+=1
4160 ENDWHILE
4170 PTR#f%=16
4180 DIM win_index% n%*28
4190 win_top%=win_index%+n%*28
4200 n%=0
4210 off%=FNget_word(f%)
4220 WHILE off%
4230 PROCtemp_info(f%,off%,winsize%,indsize%)
4240 win_index%!(n%*28+12)=winsize%
4250 ind%+=indsize%
4260 win%+=winsize%
4270 PTR#f%=PTR#f%+20
4280 off%=FNget_word(f%)
4290 n%+=1
4300 ENDWHILE
4310 CLOSE#f%
4320 DIM win_store% win%+1000,indir% ind%+1000,win_buff% &1000
4330 win_loc%=win_store%
4340 SYS "Wimp_OpenTemplate",,alias$+".Templates"
4350 start%=indir%
4360 end%=start%+ind%
4370 pos%=0
4380 FOR i%=0 TO (n%-1)*28 STEP 28
4390 $(win_index%+i%)="*"
4400 SYS "Wimp_LoadTemplate",,win_buff%,start%,end%,-1,win_index%+i%,pos% TO ,,start%,,,,pos%
4410 win_buff%!64=IconSpr
4420 win_index%!(i%+16)=win_loc%
4430 win_index%!(i%+20)=pos%
4440 win_index%!(i%+24)=0
4450 PROCcopy_block(win_buff%,win_loc%,win_index%!(i%+12))
4460 win_loc%+=win_index%!(i%+12)
4470 NEXT
4480 SYS "Wimp_CloseTemplate"
4490 ELSE
4500 d=FNdialog("File 'Templates' not found")
4510 ENDIF
4520 ENDPROC
4530 :
4540 DEF FNget_word(f%)
4550 w%?0=BGET#f%
4560 w%?1=BGET#f%
4570 w%?2=BGET#f%
4580 w%?3=BGET#f%
4590 =!w%
4600 :
4610 DEF FNgwp(f%,p%)
4620 PTR#f%=p%
4630 =FNget_word(f%)
4640 :
4650 DEF FNgsp(f%,p%)
4660 PTR#f%=p%
4670 =GET$#f%
4680 :
4690 DEF PROCtemp_info(f%,p%,RETURN win%,RETURN ind%)
4700 LOCAL op%,v%,l%,i%,ics%
4710 op%=PTR#f%
4720 ind%=0
4730 IF FNgwp(f%,p%+56) AND 1<<8 THEN
4740 v%=FNgwp(f%,p%+76)
4750 l%=FNgwp(f%,p%+80)
4760 ind%+=l%
4770 IF v%<>-1 ind%+=LENFNgsp(f%,v%)+1
4780 ENDIF
4790 ics%=FNgwp(f%,p%+84)
4800 IF ics% THEN
4810 i%=p%+88
4820 FOR k%=0 TO ics%-1
4830 IF FNgwp(f%,i%+16) AND 1<<8 THEN
4840 v%=FNgwp(f%,i%+24)
4850 l%=FNgwp(f%,i%+28)
4860 ind%+=l%
4870 IF v%<>-1 ind%+=LENFNgsp(f%,p%+v%)+1
4880 ENDIF
4890 i%+=32
4900 NEXT
4910 ENDIF
4920 PTR#f%=op%
4930 win%=ics%*32+88
4940 ENDPROC
4950 :
4960 DEF PROCcopy_block(A%,B%,C%)
4970 LOCAL copy%
4980 copy%=FNgetablock(20)
4990 P%=copy%
5000 [OPT 0
5010 LDR  r3,[r0],#4
5020 STR  r3,[r1],#4
5030 SUBS r2,r2,#4
5040 BGT  copy%
5050 MOV  pc,14
5060 ]
5070 CALL copy%
5080 PROCfreeablock(copy%)
5090 ENDPROC
5100 :
5110 DEF FNwin_name_ptr(w$)
5120 LOCAL p%
5130 p%=win_index%
5140 WHILE w$<>$p% AND p%<win_top%
5150 p%+=28
5160 ENDWHILE
5170 IF w$<>$p% p%=0
5180 =p%
5190 :
5200 DEF FNwin_hand_ptr(h%)
5210 LOCAL p%
5220 p%=win_index%
5230 WHILE h%<>p%!24 AND p%<win_top%
5240 p%+=28
5250 ENDWHILE
5260 IF h%<>p%!24 p%=0
5270 =p%
5280 :
5290 DEF FNwin_hand(w$)
5300 =!(FNwin_name_ptr(w$)+24)
5310 :
5320 DEF PROCcreate_game_window
5330 LOCAL x%,y%,temp%,i%,a%
5340 temp%=FNgetablock(rows*cols*32+1024)
5350 win_ptr%=FNwin_name_ptr("main")
5360 IF win_ptr%!24<>0 THEN
5370 !temp%=win_ptr%!24
5380 SYS "Wimp_CloseWindow",,temp%
5390 SYS "Wimp_DeleteWindow",,temp%
5400 ENDIF
5410 PROCcopy_block(win_ptr%!16,temp%+4,win_ptr%!12)
5420 i%=8
5430 FOR y%=0 TO rows-1
5440 FOR x%=0 TO cols-1
5450 a%=temp%+4+88+32*i%
5460 a%!0=16+40*x%
5470 a%!4=-112-40*y%
5480 a%!8=a%!0+40
5490 a%!12=a%!4+40
5500 a%!16=%11010+(3<<12)
5510 $(a%+20)="block"
5520 i%+=1
5530 NEXT
5540 NEXT
5550 temp%!88=i%
5560 FOR i%=4 TO 7
5570 a%=temp%+4+88+32*i%
5580 a%!4=a%!4-40*(rows-10)
5590 a%!8=a%!8+40*(cols-20)
5600 NEXT
5610 temp%!(4+4)=temp%!(4+4)-40*(rows-10)
5620 temp%!(4+8)=temp%!(4+8)+40*(cols-20)
5630 temp%!(4+44)=temp%!(4+44)-40*(rows-10)
5640 temp%!(4+48)=temp%!(4+48)+40*(cols-20)
5650 SYS "Wimp_CreateWindow",,temp%+4 TO hand%
5660 win_ptr%!24=hand%
5670 !temp%=hand%
5680 temp%!28=-1
5690 SYS "Wimp_OpenWindow",,temp%
5700 PROCfreeablock(temp%)
5710 ENDPROC
5720 :
5730 DEF PROCcreate_window(win$,o%)
5740 LOCAL q%
5750 q%=FNgetablock(256)
5760 win_ptr%=FNwin_name_ptr(win$)
5770 IF win_ptr%!24=0 THEN
5780 SYS &400C1,,win_ptr%!16 TO hand%
5790 win_ptr%!24=hand%
5800 q%!0=hand%
5810 ELSE
5820 q%!0=win_ptr%!24
5830 ENDIF
5840 IF o% THEN
5850 SYS "Wimp_GetWindowState",,q%
5860 SYS "Wimp_OpenWindow",,q%
5870 ENDIF
5880 PROCfreeablock(q%)
5890 ENDPROC
5900 :
5910 DEF FNmouse_button
5920 LOCAL q%,b%
5930 q%=FNgetablock(256)
5940 SYS &400CF,,q%
5950 b%=q%!8
5960 PROCfreeablock(q%)
5970 =b%
5980 :
5990 DEF PROCload_menus
6000 LOCAL fp%,f%,f$,ic%,sub%,data%,l$
6010 LOCAL found%,size%
6020 SYS "OS_File",5,alias$+".Menu" TO found%,,,,size%
6030 IF found% THEN
6040 DIM menu%(10),menu$(10)
6050 fp%=OPENIN(alias$+".Menu")
6060 DIM tp% 1000,menp% 1000
6070 mp%=menp%
6080 menu_cnt%=0
6090 l$=FNget_line(fp%)
6100 WHILE NOT(EOF#fp%)
6110 menu_cnt%+=1
6120 menu%(menu_cnt%)=mp%
6130 l$=RIGHT$(l$,LENl$-5)
6140 menu$(menu_cnt%)=RIGHT$(l$,LENl$-INSTR(l$,"<")-1)
6150 $mp%=LEFT$(l$,INSTR(l$,"<")-2)
6160 mp%!12=&00070207
6170 mp%!16=0
6180 mp%!20=44
6190 mp%!24=0
6200 mp%+=28
6210 l$=FNget_line(fp%)
6220 width%=0
6230 ht%=0
6240 WHILE NOT(EOF#fp%) AND LEFT$(l$,4)<>"MENU" AND l$<>""
6250 ht%+=44
6260 f$=LEFT$(l$,5)
6270 f%=0
6280 ic%=&7000021
6290 sub%=-1
6300 data%=0
6310 bcol%=FALSE
6320 IF INSTR(f$,"t") f%=f% OR 1
6330 IF INSTR(f$,"d") f%=f% OR 2
6340 IF INSTR(f$,"w") f%=f% OR 4
6350 IF INSTR(f$,"m") f%=f% OR 8
6360 IF INSTR(f$,"l") f%=f% OR &80
6370 IF INSTR(f$,"s") ic%=ic% OR &400000
6380 IF INSTR(f$,"b") bcol%=TRUE
6390 IF INSTR(l$,">") THEN
6400 sub$=RIGHT$(l$,LENl$-INSTR(l$,">")-1)
6410 l$=LEFT$(l$,INSTR(l$,">")-2)
6420 IF f% AND 8 THEN
6430 sub%=FNwin_name_ptr(sub$)
6440 ELSE
6450 sub%=EVALsub$
6460 ENDIF
6470 f%=f% OR 8
6480 ENDIF
6490 mp%!0=f%
6500 mp%!4=sub%
6510 l$=RIGHT$(l$,LENl$-5)+CHR$13
6520 len%=LENl$
6530 IF len%>width% width%=len%
6540 IF bcol% THEN
6550 ic%=ic% OR VALl$<<28
6560 ic%=ic% OR 8+32
6570 CASE VALl$ OF
6580 WHEN 0,1,2,3,9,12,14,15:ic%=ic% OR 7<<24
6590 OTHERWISE:ic%=ic% EOR 7<<24
6600 ENDCASE
6610 width%=len%+2
6620 ENDIF
6630 IF len%>12 THEN
6640 ic%=ic% OR &100
6650 mp%!12=tp%
6660 mp%!16=-1
6670 mp%!20=len%
6680 $tp%=l$
6690 tp%=tp%+len%
6700 ELSE
6710 $(mp%+12)=l$
6720 ENDIF
6730 mp%!8=ic%
6740 l$=FNget_line(fp%)
6750 mp%+=24
6760 ENDWHILE
6770 l$=FNget_line(fp%)
6780 menu%(menu_cnt%)!16=width%*16
6790 IF bcol% menu%(menu_cnt%)!20=40
6800 IF menu_cnt%=1 main_height%=ht%+96
6810 ENDWHILE
6820 CLOSE#fp%
6830 ELSE
6840 d=FNdialog("File 'Menu' Not Found")
6850 ENDIF
6860 ENDPROC
```

Listing 5 – MakeMine

```
   10 REM >MakeMine (Info6)
   20 REM Create files for !Mine
   30 REM Original files by D Walters & A Fawcett
   40 REM for 32-bit machines
   50 REM (c) BAU January 1993
   60 :
   70 free%=(HIMEM-END-&8000) AND &FFFFF000
   80 DIM q% &100,w% free%
   90 REPEAT
```

```
  100 READ file$
  110 IF file$<>"*" THEN
  120 PRINT file$
  130 READ type%,olen%
  140 IF type%=&FFF OR type%=&FFE OR typ
e%=&FEB THEN
  150 out%=OPENOUT(file$)
  160 REPEAT
  170 READ line$
  180 IF line$<>"*" BPUT#out%,line$
  190 UNTIL line$="*"
  200 CLOSE#out%
  210 SYS "OS_File",18,file$,type%
  220 ELSE
  230 line%=0
  240 d$=""
  250 i%=0
  260 WHILE i%<olen%
  270 b$=FNc
  280 IF b$>="a" AND b$<="z" THEN
  290 off%=-EVAL("&"+FNc+FNc)
  300 FOR k%=0 TO (ASC(b$)-ASC"a"+2)
  310 w%?i%=w%?(i%+off%)
  320 i%+=1
  330 NEXT
  340 ELSE
  350 w%?i%=EVAL("&"+b$+FNc)
  360 i%+=1
  370 ENDIF
  380 ENDWHILE
  390 SYS "OS_File",10,file$,type%,,w%,w
%+olen%
  400 ENDIF
  410 ENDIF
  420 UNTIL file$="*"
  430 END
  440 :
  450 DEF FNc
  460 LOCAL c$
  470 IF d$="" THEN
  480 READ d$,ch$
  490 line%+=1
  500 $q%=d$
  510 SYS "OS_CRC",0,q%,q%+LEN(d$),1 TO
crc%
  520 IF crc%<>EVAL("&"+ch$) PRINT"Error
 in data line ";line%:END
  530 ENDIF
  540 c$=LEFT$(d$,1)
  550 d$=MID$(d$,2)
  560 =c$
  570 :
  580 DATA "!Boot",&FEB,&38
  590 DATA | !Boot file for !Mine
  600 DATA
  610 DATA IconSprites <Obey$Dir>.!Sprit
es
  620 DATA *
  630 DATA "!Run",&FEB,&85
  640 DATA | !Run file for !Mine
  650 DATA
  660 DATA WimpSlot -min 128k -max 128k
  670 DATA IconSprites <Obey$Dir>.!Sprit
es
  680 DATA Set Mine$Dir <Obey$Dir>
  690 DATA Run <Mine$Dir>.!RunImage
  700 DATA *
  710 DATA "Menu",&FFF,&45
  720 DATA MENU Mine < main
  730 DATA m    Info > info
  740 DATA m    Start Game > start
  750 DATA l    Quit
  760 DATA
  770 DATA *
  780 DATA "Sprites",&FF9,&1170
  790 DATA 1600000010a047411000098,50FB
  800 DATA a0C626C6F636Ba14a170002,9EDF
  810 DATA a1C08e0C07a282Ca2Ca0400,332E
  820 DATA 0Ce20b2730b2C1111111a0,1DB0
  830 DATA 433i0Ci0Cu18z30a5833333,AF85
  840 DATA 333a04b54b9831i74z98f37,807F
  850 DATA b8Cb4388h0C83i0Cj18j24u,9EF4
  860 DATA 18338888b49m60b9832z98x,C7AD
  870 DATA 98939939gA4993399i5Ci0C,71FB
  880 DATA 93h24c23f3Cb3Bf3C99j3Ci,F4E3
  890 DATA 98bF4z98u98A3AA3AgF4AA3,29D1
  900 DATA 3AAiF4i0Ci24j18j30j48k9,397D
  910 DATA 834z98x9833BBhF4B3i0CBB,31B8
  920 DATA h18B33Bi0CBBBB3Bs3Cj48k,602C
  930 DATA 9835z98x98CCCCCh0Ck183,CE24
  940 DATA Ci68h24i0Ca30h3CC3k30i9,61BD
  950 DATA 836z98x98D3DDhF4c0BdF4D,4049
  960 DATA 33Di0CDDh24D33Dc1Ai0Cf3,58B0
  970 DATA Ci48k9837z98x98EEEEEEiE,9DC2
  980 DATA 8i0CE33Eh68b23eC8c17i0C,39A8
  990 DATA r18k9838z98x98F3FF3FgF4,9BED
 1000 DATA FF33FFi0Ch0Cz24r48k983F,4110
 1010 DATA z98i98fBF30bC81111B1BB1,CBF6
 1020 DATA B1111bF4a0CBB11BBg0C11B,4FA0
 1030 DATA 1h18b17g18a1Bu18d4830m9,6803
 1040 DATA 8666C6167z98t98B1BB7Bg7,C6AD
 1050 DATA 4i0Ca9871i8Ci0C1177hA47,76A1
 1060 DATA 17717z98d986D696E65z98f,D227
 1070 DATA 98fCFbF4333377aDEa04d18,AC57
 1080 DATA 7777b0Fd1870c0Dd24a18i0,A7AB
 1090 DATA Cg18j30j5419877726F6E67,7F7E
 1100 DATA z98e98BBeD0BBbA4BBc98BB,233D
 1110 DATA dA4BBa98a1EdB0BB77b1Ce9,D8B3
 1120 DATA 8a1Aq18i30d55c48j60b986,AEFE
 1130 DATA 36C656172z98e98vDCvF4z3,4B52
 1140 DATA 0z48bEC3Ca89726164696F6,30F5
 1150 DATA F6Eg9815eA417e983401000,1663
 1160 DATA 014aF411111111137c06c0,9C39
 1170 DATA B713713g0D773733g177722,E9A3
 1180 DATA 33f1977272232e19a1722f1,74D6
 1190 DATA 9a17BBe19a2EB2BB2Bd32b1,5E03
 1200 DATA 7BBd19c17BBd19d17d19332,DDF4
 1210 DATA 3e0C0200113133e24001011,B8A9
 1220 DATA e19b1711d19d17d19d17c19,432E
 1230 DATA 22e17c32e17c32f17111F33,DCB0
 1240 DATA 03f17a4B03f17aFE03cFC00,DE6D
 1250 DATA 0000000000FFc07c06F0FF0,4D0F
 1260 DATA Fg12FFFFd07c17FFc19b2Aa,1D14
 1270 DATA 17c19a36b17c19a42c17b32,53DC
 1280 DATA FFe17b32FFf17a4BFFf17a4,441B
 1290 DATA Bg16g1Fe3Fj24j3Ck54j6Ck,D963
 1300 DATA 84j9CkB4jCCkE4fFC3C0200,9F1B
 1310 DATA 00726164696F6F6666bFCa0,E135
 1320 DATA F0015aFE04aFD1BaF92CaFD,9E11
 1330 DATA 3401000014aF91011111111,AF2
 1340 DATA 0113c06c0C0033g0C010033,B075
 1350 DATA b19c18001031b19b2401001,D4E3
 1360 DATA 111b19b30b40b19a3Cb17c1,527C
 1370 DATA 9a48d57a320110d17b32011,802F
 1380 DATA 0d6Eb32a7Ed17a4B0330c73,76C
 1390 DATA b89770710c73a95717701d7,9DED
 1400 DATA 3b1717a9Cd197177bA8d197,7679
 1410 DATA 717cB4bA5a17cC0bA5a17dC,1889
 1420 DATA C3313b17dD83133b17eE433,5A67
 1430 DATA b17eF031b1711710F000000,993D
 1440 DATA 00F0c06c0600FFFFg12F0FF,FFFE
 1450 DATA FFc07b24FFFFc19b2Aa17c1,FE55
 1460 DATA 9b36b17b32a42c17b32a4Ed,1539
 1470 DATA 17a4BF00Fe17a4BF00Ff17F,34ED
 1480 DATA FFFg16h13e3Fi24k3Cj54k6,6731
 1490 DATA Cj84k9CjB4kCCjE4fFC78aF,55D9
 1500 DATA C7074725F64656661756C74,4186
 1510 DATA b26000Ac06000015aF94CaF,5E2E
 1520 DATA Da040008d40FFbFAd49c649,E2CC
 1530 DATA 9a6F9907a74a04000500005,BD72
 1540 DATA 559a04A905a045A0155A9AA,963B
 1550 DATA 16a0815555969005415A401,62BF
 1560 DATA 000090060000401Ac5AA4aA,E2A9
 1570 DATA 873696768d720000a1Eg780,ADB2
 1580 DATA Bu7801DDDDDa04DD00DDaE,CB9D
 1590 DATA 5a04f78eAFaFA80eBAAA2Ac,59D5
 1600 DATA C9A0808002bF80880cC080A,847A
 1610 DATA AAAAAAAi10g20f30g40d95E,5504
 1620 DATA CaFC646563g62bA4b9Cb941,229
 1630 DATA FaFD2CaFD8CaFC0CaFC1111,A704
 1640 DATA 11111110044d0711c08a15,D0DD
 1650 DATA b10b1Ca18c2344d07a20d2A,E1AD
 1660 DATA a30c33b38b3Cf0Df1Ed5011,9A09
 1670 DATA 4444FFcE8FFFFc08a07b10b,D0A1
 1680 DATA 07a18c07FFd0Ed0Ch0Bh18g,8E81
 1690 DATA 28g38g48b58bEC696EzECiE,D45D
 1700 DATA C0041eEF11d09aFEc12bEAa,82FC
 1710 DATA 1B55cEB41e081152eF455dF,85C4
 1720 DATA C55d28a07b38b07a48c0711,4D66
 1730 DATA 00d07h96hEFgF0gF1zF2iF1,CD5E
 1740 DATA 148cEED4aFC646F776EfED0,14F0
 1750 DATA 2aFC06aFA04iEC80eEC01f2,831F
 1760 DATA 5aFCeF6dCCg0D55F5eFEaF9,C361
 1770 DATA 15F1cF9c0B11b0Cb27a0B11,8FE3
 1780 DATA 111CbFB54c0BbE0sBB0FF0h,F295
 1790 DATA C40F00f0D00a0Ce0DaCCa0C,F4B3
 1800 DATA c1AbD0b0Ca27gD47570hADz,E80D
 1810 DATA D4cC70140gCE0110gCEa0Bf,C5E8
 1820 DATA CEc0BdDBe0BbE8g0B111143,8711
 1830 DATA 4155555555a04b07j8CmA4i,FA6F
 1840 DATA BCiD4iECgF6gFFcFBFF,6D3B
 1850 DATA "!Sprites",&FF9,&2E0
 1860 DATA 0100000010a04E4020000D4,5270
 1870 DATA a04216D696E65a14a170004,8E6C
 1880 DATA e1Cb0F07a282Ca2C80a310C,8DB9
 1890 DATA e20b2730i0C0011B1BB7B11,CA01
 1900 DATA 111133a54888888d46b61c5,DD3
 1910 DATA 003i141011BBBB17111131q,450E
 1920 DATA 14d14b6Fc281111b2883a4F,5404
 1930 DATA 8877114333333333h1471d,3B76
 1940 DATA 1477e143003a3C7777a6473,51BD
 1950 DATA a13d28FF08b50aA1a14f28F,935D
 1960 DATA F08c48a4Di148888bC63377,B016
 1970 DATA 7777o14b15g508888BBBBBB,6368
 1980 DATA f40q14eA0c48c4Dd0AdF1dF,F06F
 1990 DATA 7g0CF4FFFFs18r2DF0FFFFF,89F9
 2000 DATA FFFa04FF0Fq14e14a23q14q,EEF9
 2010 DATA 14j28c58q14q14z28r50f95,ED17
 2020 DATA q14z28z3ChFDeF0n154F041,F6E7
 2030 DATA 8,D201
 2040 DATA "Templates",&FEC,&697
 2050 DATA FFFFFFFF00000000a04c075,713E
 2060 DATA Ca0D5D01000001a156D6169,A1DB
 2070 DATA 6E0D0494E5010040E2B9a14,1FC5
 2080 DATA 3802d1873746172740D00EB,827E
 2090 DATA 011087E2F1030000A6e1869,736B
 2100 DATA 6E666F0Da18EC7484E5b54a,33C4
 2110 DATA 2F006Ca5D46a2458b0De693,DD12
 2120 DATA C0700001200278707020701,AAA
 2130 DATA 03010Cc7F14FEFFFF44a4Cb,3D8A
 2140 DATA 8C3Db7D30d84b8858a90bA8,90C
 2150 DATA 0DaA908aADa0400C8aB9BEa,EB93
 2160 DATA B9F8aC1386000073C556E74,B22F
 2170 DATA 69746C65643E0D7Fb52f20F,F9B6
 2180 DATA 4d2037n20CCaF9BAe203960,1042
 2190 DATA 001B3030300Df40DAe608Aa,6D2F
 2200 DATA F4b60196000C74D696E6573,E262
 2210 DATA 204C6566740D7Fb841CaB03,FBE7
 2220 DATA CaFCC0u80f20BCu8020aF03,9DB5
 2230 DATA 8h2017jC010aFF24a6034a6,EB37
 2240 DATA 0B8dE077jE0b8C0DC4aFDB8,481D
 2250 DATA 02000038a04D4a89aF4b050,C5A1
 2260 DATA 03407000012000584070207,1539
 2270 DATA 010301bEB0000E4aAD74aCD,E990
 2280 DATA b263Db2B300000e0F005374,5008
 2290 DATA 6172742067616D650D650Fa,7C15
 2300 DATA F92CaFD70aFDCCaE5E0qDDa,60C6
 2310 DATA 3Bg20DCqDDb2074aF5C8h20,DFD7
 2320 DATA kDDbFD3CaF514a90F8aFD1C,A637
 2330 DATA 6000C7jFD60aFDA8aF598e6,FC40
 2340 DATA 01Aa206DbF10D0DcFDDCaF8,45AF
 2350 DATA F4aD04CaD024aA83D9001C7,9573
 2360 DATA cC40DcC47F34aE880aC06Ca,365B
 2370 DATA F0B0aC839a8034300DgC06C,A539
 2380 DATA aFFE8a40A4aFF18q20b807C,10EF
 2390 DATA e80ACq40F0aF8b600Ce601A,56A
 2400 DATA 2000C76465630DfE074eE0A,A0A9
 2410 DATA 2aE86Ce2075700Dg2048e60,17A3
 2420 DATA 64e60n4014eC030i60696E1,249E
 2430 DATA 6014e6044f806F776E0DeE0,B0B0
 2440 DATA 90eC0ACi60j409EaB890020,2734
 2450 DATA 0001A0400006403aEDaF0b0,FB2
 2460 DATA 64007000012001384070207,989B
 2470 DATA 010C0E0Cd19FCFFFF0005d2,1A15
 2480 DATA 43DaF000300000b07b3658a,B980
 2490 DATA 44aFFFF13aF010aF49AaF8C,F31D
 2500 DATA CaF876a5Ca37FF386000073,20D2
 2510 DATA C556E74fF8b2098e20C8q20,ADF0
 2520 DATA 9Ei20C4d4037n20f60F8u20,EA9
 2530 DATA D0aF872e203960001B214D6,2B41
 2540 DATA 96E650DFFFF18aE73Ee20bA,A315
 2550 DATA 8b40190000174E616D653A0,2283
 2560 DATA DcA0FE0EaF29Ce20b80b205,ECE0
 2570 DATA 07572706F73a23a201EaFF6,6E96
 2580 DATA 8e4090e40417574686F723A,C243
 2590 DATA 0Df4038e6060e6056657273,C315
 2600 DATA 696F6Ec40bE0b60bA0bE039,3504
 2610 DATA 6100176BaECaF3FF1BaFCb9,143D
 2620 DATA 864eE094dE007nE0f20b80a,A970
 2630 DATA 2037n20bA0b60bA0b607De6,212
 2640 DATA 01Ce6030e60bA0r60f205Cu,805E
 2650 DATA 6034eC0b20bC093eC01DaFC,AFE3
 2660 DATA 41626F75742074686973207,B86A
 2670 DATA 0726F6772616D0D4D696E65,3391
 2680 DATA 2D537765657065722047616,6D9E
 2690 DATA D650D442E57616C74657273,3E54
 2700 DATA 202620412E4661776365747,C9F
 2710 DATA 40D312E313020283236204F,7DA5
 2720 DATA 63742031393932290D,D076
 2730 DATA *
```

Listing 6 – Mine8

```
   10 REM >Mine8 (Info7)
   20 REM 8bit conversion by DL
   30 REM For all machines
   40 REM (C) BAU January 1993
   50 :
   60 MODE 1
   70 arc=(HIMEM>&10000)
   80 IF (NOT arc) AND PAGE>&1100 THEN P
AGE=&1100:CHAIN "Mine8"
   90 VDU 23;10,32;0;0;0;0;
  100 PROCinit
  110 IF NOT arc THEN HIMEM=screen
  120 REPEAT
  130 done=FALSE
  140 PROCblank(FALSE)
  150 PROCadjust
  160 PROCplay
  170 UNTIL FNquit
  180 MODE 1
  190 *FX229,0
  200 *FX4,0
  210 END
  220 :
  230 DEF PROCinit
  240 lines=23
  250 screen=&8000-lines*&280
  260 VDU 23;12,(screen DIV 8) DIV 256;0
;0;0;0;
  270 VDU 23;13,(screen DIV 8) MOD 256;0
;0;0;0;
  280 VDU 23;6,lines;0;0;0;0;
  290 top=32-lines
  300 VDU 19,1,4;0;19,2,6;0;
  310 DIM t$(13),d(8,1),vx(2),v$(2),v(2)
,max(2),w 22*12
  320 FOR i=0 TO 2
  330 READ vx(i),v$(i),v(i),max(i)
  340 NEXT
  350 ad=0:trod=&30:mine=9:wrong=10:dead
=1:quit=2:end=3:clear=0:flag=1:maybe=2
  360 flat$=FNread
  370 tile$=FNread
  380 FOR i=1 TO 8
  390 t$(i)=FNb(48+i,0,3)
  400 NEXT
  410 t$(mine)=FNb(130,3,0)
  420 t$(wrong)=FNplot(0,0,-4)+FNgcol(0)
+CHR$5+CHR$130+FNplot(0,-32,0)+FNgcol(2)
+CHR$131+CHR$4
  430 flag$=FNplot(0,-44,-12)+FNb(128,1,
3)
  440 maybe$=FNplot(0,-44,-16)+FNgcol(0)
+CHR$5+CHR$129+CHR$4
  450 VDU 23,128,&0E,&0C,&08,&08,&08,&1C
,&3E,&00
  460 VDU 23,129,&1C,&22,&02,&04,&08,&00
,&08,&00
  470 VDU 23,130,&06,&08,&1C,&3E,&3E,&3E
,&1C,&00
  480 VDU 23,131,&41,&22,&14,&08,&14,&22
,&41,&00
  490 *FX4,1
  500 *FX229,1
  510 ENDPROC
  520 :
  530 DEF FNread
  540 a$=""
  550 REPEAT
  560 READ n$:z=VALMID$(n$,2):n$=LEFT$(n
$,1)
  570 IF n$="c" a$=a$+FNgcol(z)
  580 IF n$="p" READ x,y:a$=a$+FNplot(z,
x,y)
  590 UNTIL n$="x"
  600 =a$
  610 :
  620 DEF FNgcol(c)=CHR$18+CHR$0+CHR$c
  630 DEF FNplot(p,x,y)=CHR$25+CHR$p+FNw
(x)+FNw(y)
  640 DEF FNw(a)=CHR$((a+65536) MOD 256)
+CHR$((a+65536) DIV 256)
  650 DEF FNb(c,o,i)=CHR$5+FNgcol(o)+CHR
$c+FNplot(0,-32,-8)+CHR$c+FNplot(0,-36,4
)+CHR$c+FNplot(0,-24,0)+CHR$c+FNgcol(i)+
FNplot(0,-36,0)+CHR$c+CHR$4
  660 DEF FNpeek(px,py)=?(w+px+py*22)
  670 DEF PROCpoke(px,py,pp,f)
  680 ?(w+px+py*22)=pp
  690 IF f PROCtile(px,py,pp)
  700 ENDPROC
  710 :
  720 DEF PROCtile(x,y,t)
  730 MOVE (x-1)*64+4,(y-1)*64+4
  740 s=t DIV 16
  750 IF s=flag PRINTtile$;flag$;:ENDPRO
C
  760 IF s=maybe PRINTtile$;maybe$;:ENDP
ROC
  770 IF s=clear PRINTtile$;:ENDPROC
  780 PRINTflat$;t$(t MOD 16);
  790 ENDPROC
  800 :
  810 DEF PROCblank(new)
  820 xsize=v(0):ysize=v(1):mines=v(2)
  830 IF new VDU 28,0,31,39,top+2,12,26
  840 blx=(20-xsize)*32:bly=32+(10-ysize
)*32
  850 VDU 29,blx;bly;
  860 FOR i=0 TO 22*12-1:w?i=trod:NEXT
  870 FOR y=1 TO ysize
  880 FOR x=1 TO xsize
  890 PROCpoke(x,y,0,TRUE)
  900 NEXT
  910 NEXT
  920 FOR m=1 TO mines
  930 REPEAT
  940 x=RND(xsize):y=RND(ysize)
  950 UNTIL FNpeek(x,y)<>mine
  960 PROCpoke(x,y,mine,FALSE)
  970 FOR x1=x-1 TO x+1
  980 FOR y1=y-1 TO y+1
  990 z=FNpeek(x1,y1)
 1000 IF z<>mine PROCpoke(x1,y1,z+1,FALS
E)
 1010 NEXT
 1020 NEXT
 1030 NEXT
 1040 ENDPROC
 1050 :
 1060 DEF PROCadjust
 1070 PRINTFNv(0,0);FNv(1,0);FNv(2,0);
 1080 oad=-1
 1090 REPEAT
 1100 REPEAT
 1110 IF ad<>oad PRINTFNv(ad,1);
```

```
1120 oad=ad
1130 k=GET
1140 IF k=136 PRINTFNv(ad,0);:ad=(ad+2)MOD3
1150 IF k=137 PRINTFNv(ad,0);:ad=(ad+1)MOD3
1160 IF k=138 AND v(ad)>1 v(ad)=v(ad)-1:oad=-1
1170 IF k=139 AND v(ad)<max(ad) v(ad)=v(ad)+1:oad=-1
1180 UNTIL k=13 OR k=27 OR k=32
1190 UNTIL v(2)<v(0)*v(1) OR k=27
1200 COLOUR 128
1210 PRINTTAB(0,top);SPC40;
1220 IF k=27 done=quit:ENDPROC
1230 IF xsize<>v(0) OR ysize<>v(1) OR mines<>v(2) PROCblank(mines=v(2))
1240 ENDPROC
1250 :
1260 DEF FNv(v,b)
1270 COLOUR 128+b
1280 COLOUR 2:PRINTTAB(vx(v)-1,top);" ";v$(v);" ";
1290 COLOUR 3:PRINTRIGHT$("  "+STR$v(v),2);" ";
1300 =""
1310 :
1320 DEF PROCplay
1330 xp=xsize DIV 2:IF xp=0 xp=1
1340 yp=ysize DIV 2:IF yp=0 yp=1
1350 IF done=quit ENDPROC
1360 marks=mines:left=mines:start=TIME:tick=start
1370 COLOUR 2:PRINTTAB(1,top);"Time";TAB(29,top);"Mines: ";FNmarks;FNtime;
1380 REPEAT
1390 REPEAT
1400 IF TIME>tick+100 tick=TIME:PRINTFNtime;
1410 PROCcurs(xp,yp,2)
1420 k=INKEY20
1430 PROCcurs(xp,yp,0)
1440 IF k=-1 k=INKEY20
1450 UNTIL k<>-1
1460 IF k=136 xp=xp-1:IF xp=0 xp=xsize
1470 IF k=137 xp=xp+1:IF xp>xsize xp=1
1480 IF k=138 yp=yp-1:IF yp=0 yp=ysize
1490 IF k=139 yp=yp+1:IF yp>ysize yp=1
1500 IF k=32 now=TIME:PROCtread(xp,yp):TIME=now
1510 IF k=13 PROCmark(xp,yp,-1)
1520 IF k=ASC"F" OR k=ASC"f" PROCmark(xp,yp,flag)
1530 IF k=ASC"M" OR k=ASC"m" PROCmark(xp,yp,maybe)
1540 IF k=ASC"C" OR k=ASC"c" PROCmark(xp,yp,clear)
1550 IF k=27 done=quit
1560 UNTIL done
1570 IF done=dead OR done=end PROCreveal
1580 ENDPROC
1590 :
1600 DEF FNtime
1610 time=(TIME-start) DIV 100
1620 s=time MOD 60
1630 m=(time DIV 60) MOD 60
1640 COLOUR 3:PRINTTAB(6,top);RIGHT$("00"+STR$m,2);":";RIGHT$("00"+STR$s,2);
1650 =""
1660 :
1670 DEF FNmarks
1680 COLOUR 3:PRINTTAB(37,top);RIGHT$(" "+STR$marks,2);
1690 =""
1700 :
1710 DEF PROCcurs(x,y,c)
1720 GCOL 0,c:MOVE (x-1)*64,(y-1)*64:PLOT 1,64,0:PLOT 1,0,64:PLOT 1,-64,0:PLOT 1,0,-64
1730 ENDPROC
1740 :
1750 DEF PROCtread(x,y)
1760 t=FNpeek(x,y) MOD 16
1770 IF FNpeek(x,y)>15 ENDPROC
1780 IF t=mine done=dead
1790 PROCpoke(x,y,t OR trod,TRUE)
1800 IF t>0 ENDPROC
1810 PROCtread(x-1,y-1):PROCtread(x-1,y)
1820 PROCtread(x-1,y+1):PROCtread(x,y+1)
1830 PROCtread(x+1,y+1):PROCtread(x+1,y)
1840 PROCtread(x+1,y-1):PROCtread(x,y-1)
1850 ENDPROC
1860 :
1870 DEF PROCmark(x,y,m)
1880 t=FNpeek(x,y) MOD 16:s=FNpeek(x,y) DIV 16
1890 IF s=3 ENDPROC
1900 IF m=-1 m=(s+1) MOD 3 ELSE IF m=s m=clear
1910 marks=marks-(s=flag)+(m=flag)
1920 left=left-(s=flag AND t=mine)+(m=flag AND t=mine)
1930 PRINTFNmarks;
1940 PROCpoke(x,y,t+16*m,TRUE)
1950 IF marks=0 done=end
1960 ENDPROC
1970 :
1980 DEF PROCreveal
1990 IF left=0 PRINTFNm("All mines found!"):ENDPROC
2000 IF done=dead PRINTFNm("B O O M !")
2010 FOR y=1 TO ysize
2020 FOR x=1 TO xsize
2030 a=FNpeek(x,y) MOD 16:b=FNpeek(x,y) DIV 16
2040 IF b=0 AND a=mine PROCtile(x,y,mine OR trod)
2050 IF b=flag AND a<>mine PROCtile(x,y,wrong OR trod)
2060 NEXT
2070 NEXT
2080 IF done=dead PROCcurs(xp,yp,2):ENDPROC
2090 m$=STR$left+" wrong flag":IF left>1 m$=m$+"s"
2100 PRINTFNm(m$+"!")
2110 ENDPROC
2120 :
2130 DEF FNm(m$)
2140 VDU 29,(1280-32*LENm$)/2;32*lines-8;5,18,0,1
2150 MOVE 0,4:PRINTm$;:MOVE 0,-4:PRINTm$;
2160 MOVE 4,0:PRINTm$;:MOVE -4,0:PRINTm$;
2170 MOVE 0,0:GCOL 0,2:PRINTm$;
2180 VDU 29,blx;bly;
2190 =CHR$4
2200 :
2210 DEF FNquit
2220 PRINTTAB(6,31);"Press any key to play again";
2230 k=GET
2240 PRINTTAB(0,31);SPC39;
2250 VDU 28,0,top+1,39,top,12,26,29,blx;bly;
2260 PROCcurs(xp,yp,0)
2270 =(k=27)
2280 :
2290 DATA  3,Width,12,20
2300 DATA 15,Height,8,10
2310 DATA 28,Mines,15,99
2320 :
2330 DATA c1,p0,0,56,p81,56,-56,p81,0,56,p0,-44,-12,x
2340 DATA c3,p1,0,56,p1,56,0
2350 DATA c1,p33,0,-56,p1,-56,0,p1,4,4,p1,48,0,p1,0,48
2360 DATA c3,p1,-48,0,p1,0,-44
2370 DATA c2,p0,4,0,p0,0,40,p81,40,-40,p81,0,40,p0,8,8,x
```

Listing 7 – GetMC32

```
10 REM >GETmc32 (Info8)
20 REM Machine code GET
30 REM for 32-bit machines
40 REM (c) BAU January 1993
50 :
60 DIM code% &100
70 link=14:pc=15
80 FOR pass%=0 TO 2 STEP 2
90 P%=code%
100 [OPT pass%
110 .getmc
120 SWI     "OS_ReadC"
130 SWI     "OS_WriteC"
140 CMP     r0,#27
150 BNE     getmc
160 MOV     pc,link
170 ]
180 NEXT pass%
190 PRINT"Press some keys..."
200 CALL getmc
210 END
```

Listing 8 – GetMC8

```
10 REM >GETmc8 (Info9)
20 REM Machine code GET
30 REM for 8-bit machines
40 REM (c) BAU January 1993
50 :
60 DIM code% &100
70 osrdch=&FFE0
80 oswrch=&FFEE
90 FOR pass%=0 TO 2 STEP 2
100 P%=code%
110 [OPT pass%
120 .getmc
130 JSR osrdch
140 JSR oswrch
150 CMP #27
160 BNE getmc
170 RTS
180 ]
190 NEXT pass%
200 PRINT"Press some keys..."
210 CALL getmc
220 END
```

Listing 9 – INPUTmc8

```
10 REM >INPUTmc8 (Info10)
20 REM Machine code INPUT
30 REM for 8-bit machines
40 REM (c) BAU January 1993
50 :
60 DIM code% &100
70 osword=&FFF1
80 FOR pass%=0 TO 2 STEP 2
90 P%=code%
100 [OPT pass%
110 .inputmc
120 LDA #0
130 LDX #block MOD 256
140 LDY #block DIV 256
150 JSR osword
160 RTS
170 :
180 .block
190 EQUW buffer
200 EQUB 16
210 EQUB 32
220 EQUB 255
230 :
240 .buffer
250 EQUS STRING$(16," ")
260 ]
270 NEXT pass%
280 PRINT"Enter a string (up to 16 chars)"'
290 CALL inputmc
300 PRINT"The string you typed was '"$buffer"'"
310 END
```

Listing 10 – INPUTmc32

```
10 REM >INPUTmc32 (Info11)
20 REM Machine code INPUT
30 REM for 32-bit machines
40 REM (c) BAU January 1993
50 :
60 DIM code% &100
70 link=14:pc=15
80 FOR pass%=0 TO 2 STEP 2
90 P%=code%
100 [OPT pass%
110 .inputmc
120 ADR     r0,buffer
130 MOV     r1,#16
140 MOV     r2,#32
150 MOV     r3,#255
160 SWI     "OS_ReadLine"
170 MOV     pc,link
180
190 .buffer EQUS STRING$(16," ")
200 ]
210 NEXT pass%
220 PRINT"Enter a string (up to 16 chars)"'
230 CALL inputmc
240 PRINT"The string you typed was '"$buffer"'"
250 END
```

Listing 11 – INKEYmc8

```
10 REM >INKEYmc8 (Info12)
20 REM Machine code INKEY
30 REM for 8-bit machines
40 REM (c) BAU January 1993
50 :
60 DIM code% &100
70 oswrch=&FFEE
80 osbyte=&FFF4
90 delay=50
100 FOR pass%=0 TO 2 STEP 2
110 P%=code%
120 [OPT pass%
130 .inkeymc
140 LDX #delay MOD 256
150 LDY #delay DIV 256
160 LDA #129
170 JSR osbyte
180 CPY #&FF
190 BNE key_pressed
200 LDX #ASC"."
210 .key_pressed
220 TXA
230 JSR oswrch
240 CMP #27
250 BNE inkeymc
260 RTS
270 ]
280 NEXT pass%
290 PRINT"Press some keys..."
300 CALL inkeymc
310 END
```

Listing 12 – INKEYmc32

```
10 REM >INKEYmc32 (Info13)
20 REM Machine code INKEY
30 REM for 32-bit machines
40 REM (c) BAU January 1993
50 :
60 DIM code% &100
70 link=14:pc=15
80 delay=50
90 FOR pass%=0 TO 2 STEP 2
100 P%=code%
110 [OPT pass%
120 .inkeymc
130 MOV     r1,#delay MOD 256
140 MOV     r2,#delay DIV 256
150 MOV     r0,#129
160 SWI     "OS_Byte"
170 CMP     r2,#&FF
180 MOVEQ   r1,#ASC"."
190 MOV     r0,r1
200 SWI     "OS_WriteC"
210 CMP     r0,#27
220 BNE     inkeymc
230 MOV     pc,link
240 ]
250 NEXT pass%
260 PRINT"Press some keys..."
270 CALL inkeymc
280 END
```

Listing 13 – INKEY-

```
10 REM >Inkey- (Info14)
20 REM Find INKEY- values
30 REM for all machines
40 REM (c) BAU January 1993
50 :
60 PRINT"Press keys now:"
70 REPEAT
80 FOR i%=1 TO 127
90 IF INKEY-i% PRINT -i%,256-i%
100 NEXT
110 UNTIL FALSE
120 END
```

Listing 14 – Bat32

```
10 REM >Bat32 (Info15)
20 REM Machine code INKEY-
30 REM for 32-bit machines
40 REM (c) BAU January 1993
50 :
60 DIM code% &100
70 sp=13:link=14:pc=15
80 left=256-98
90 right=256-67
100 FOR pass%=0 TO 2 STEP 2
110 P%=code%
120 [OPT pass%
130 .batmove
140 STMFD   (sp)!,{r0-r12,link}
150 MOV     r4,#19
160 .batloop
170 MOV     r0,#19
180 SWI     "OS_Byte"
190 MOV     r1,#left
200 BL      inkey
210 BNE     notleft
220 CMP     r4,#0
230 SUBGT   r4,r4,#1
240 .notleft
250 MOV     r1,#right
260 BL      inkey
270 BNE     notright
280 CMP     r4,#37
290 ADDLT   r4,r4,#1
300 .notright
310 SWI     &100+31
320 MOV     r0,r4
330 SWI     "OS_WriteC"
340 SWI     &100+20
350 SWI     &100+ASC" "
360 SWI     &100+ASC"="
370 SWI     &100+ASC" "
380 SWI     "OS_ReadEscapeState"
390 BCC     batloop
400 LDMFD   (sp)!,{r0-r12,pc}
410
420 .inkey
430 STMFD   (sp)!,{link}
440 MOV     r2,#255
450 MOV     r0,#129
460 SWI     "OS_Byte"
470 CMP     r1,#255
480 LDMFD   (sp)!,{pc}
490 ]
500 NEXT pass%
510 MODE 7
520 VDU 23,1,0|
```

```
530 PRINT"Z and X move the bat!"
540 CALL batmove
550 END
```

Listing 15 – Bat8

```
10 REM >Bat8 (Info16)
20 REM Machine code INKEY-
30 REM for 8-bit machines
40 REM (c) BAU January 1993
50 :
60 DIM code% &100
70 oswrch=&FFEE
80 osbyte=&FFF4
90 left=256-98
100 right=256-67
110 FOR pass%=0 TO 2 STEP 2
120 P%=code%
130 [OPT pass%
140 .batmove
150 LDA #19
160 STA batpos
170 .batloop
180 LDA #19
190 JSR osbyte
200 LDX #left
210 JSR inkey
220 BNE notleft
230 LDA batpos
240 BEQ notleft
250 DEC batpos
260 .notleft
270 LDX #right
280 JSR inkey
290 BNE notright
300 LDA batpos
310 CMP #37
320 BEQ notright
330 INC batpos
340 .notright
350 LDX #0
360 .showbat
370 LDA batdat,X
380 JSR oswrch
390 INX
400 CPX #6
410 BNE showbat
420 BIT &FF
430 BPL batloop
440 RTS
450 :
460 .inkey
470 LDY #255
480 LDA #129
490 JSR osbyte
500 CPX #255
510 RTS
520 :
530 .batdat
540 EQUB 31
550 .batpos
560 EQUB 0
570 EQUB 20
580 EQUS " = "
590 ]
600 NEXT pass%
610 MODE 7
620 VDU 23;8202;0;0;0;
630 PRINT"Z and X move the bat!"
640 CALL batmove
650 END
```

Listing 16 – Atkinson

```
10 REM >Atkinson (Info17)
20 REM Maze challenge routines
30 REM by John Atkinson
40 :
50 DEF PROCsolve_setup
60 sz% = 15
70 no_way% = 999
80 ncells% = sz%*sz%
90 DIM map% ncells%
100 DIM notepad% ncells%
110 queue_sz% = sz% * sz%
120 DIM Qz queue_sz%
130 DIM Qd queue_sz%
140 DIM Qe queue_sz%
150 DIM Ql queue_sz%
160 DIM Qr queue_sz%
170 Qnul% = 255
180 ENDPROC
190 :
200 DEF PROCsolve_newmaze
210 mz% = (sz%*sz% - 1) / 2
220 edgefound% = FALSE
230 FOR I%= 0 TO ncells%
240   map%?I% = 0
250 NEXT
260 md% = 0
270 ENDPROC
280 :
290 DEFFNwhichway
300 IF FNedge_found THEN =FNwhichway2
ELSE =FNwhichway1
310 :
320 DEFFNwhichway1
330 LOCAL dist%, dist1%, dirn%, d0%, d
1%
340 PROCsurvey_cell
350 dist% = no_way%
360 FOR d1% = 1 TO 4
370   d0%=(md% + d1%) AND 3
380   IF NOT FNis_wall(mz%, d0%) THEN
dist1% = FNoffer(d0%) : IF dist1% < dist
% THEN dirn% = d0% : dist% = dist1%
390 NEXT
400 mz% = FNneighbour(mz%, dirn%)
410 md% = dirn%
420 =md%
430 :
440 DEFFNwhichway2
450 LOCAL d0%, 1%
460 PROCsurvey_cell :
470 d0% = FNreverse_of(md%)
480 REPEAT
490   d0% = (d0% + 3) AND 3
500   IF NOT FNis_wall(mz%, d0%) THEN
1% = FNoffer(d0%) ELSE 1% = no_way%
510 UNTIL (1% < no_way%)
520 md% = d0%
530 mz% = FNneighbour(mz%, md%)
540 =md%
550 :
560 DEFFNoffer(d0%)
570 LOCAL z0%, z1%, d1%, OK%
580 z0% = FNneighbour(mz%, d0%)
590 IF FNis_edge_cell(z0%) THEN =1
600 PROCclear_notepad
610 PROCclear_queue
620 PROCblot(mz%)
630 PROCblot(z0%)
640 qz% = z0% : ql% = 1 : PROCQ_put
650 REPEAT
660   PROCQ_get
670   ql% = ql% + 1
680   z1% = qz%
690   FOR d1% = 0 TO 3
700     OK% = FNcandidate(z1%, d1%)
710     qz% = FNneighbour(z1%, d1%)
720     IF OK% AND FNis_edge_cell(qz%)
 THEN d1%=3 : NEXT : UNTIL TRUE : =ql%
730     IF OK% THEN PROCblot(qz%) : PR
OCQ_put
740   NEXT
750 UNTIL FNqueue_empty
760 =no_way%
770 :
780 DEFPROCblot(z%)
790 notepad%?z% = 1
800 ENDPROC
810 :
820 DEFFNblotted(z%) =((notepad%?z%) =
 1)
830 :
840 DEFFNneighbour(z%, d0%)
850 IF d0% = 0 THEN = z% + 1
860 IF d0% = 1 THEN = z% + sz%
870 IF d0% = 2 THEN = z% - 1
880 = z% - sz%
890 :
900 DEFFNcandidate(z%, d0%)
910 = NOT (FNis_wall(z%, d0%) OR FNblo
tted(FNneighbour(z%, d0%)))
920 :
930 DEFPROCsurvey_cell
940 LOCAL d0%, n%
950 FOR d0% = 0 TO 3
960   n% = FNneighbour(mz%, d0%)
970   IF FNwall(d0%) THEN map%?mz% = (
map%?mz%) OR 2^d0% : IF FNin_bounds(n%)
THEN map%?n% = (map%?n%) OR 2^FNreverse_
of(d0%)
980 NEXT d0%
990 ENDPROC
1000 :
1010 DEFFNis_wall(z%, d0%) = NOT (((map
%?z%) AND (2 ^ d0%)) = 0)
1020 :
1030 DEFFNis_edge_cell(z%)
1040 LOCAL x1%, y1%
1050 x1% = z% MOD sz%
1060 y1% = z% DIV sz%
1070 = ( (x1% = 0) OR (y1% = 0) OR (x1%
= sz% - 1) OR (y1% = sz% - 1) )
1080 :
1090 DEFFNedge_found
1100 IF edgefound% THEN =TRUE
1110 IF FNis_edge_cell(mz%) THEN edgefo
und% = TRUE : md% = (md% + 3) AND 3
1120 =edgefound%
1130 :
1140 DEFFNreverse_of(d0%) = (d0% + 2) A
ND 3
1150 :
1160 DEFFNin_bounds(z1%) = (z1% >= 0) A
ND (z1% < ncells%)
1170 :
1180 DEFPROCclear_notepad
1190 LOCAL I%
1200 FOR I% = 0 TO ncells%
1210   notepad%?I% = 0
1220 NEXT
1230 ENDPROC
1240 :
1250 DEFPROCclear_queue
1260 Qnx% = 0
1270 Qroot% = Qnul%
1280 ENDPROC
1290 :
1300 DEFPROCQ_put
1310 Qnx%?Qz = qz%
1320 Qnx%?Qd = ql%
1330 Qnx%?Qe = FNshortest(qz%)
1340 Qnx%?Ql = Qnul%
1350 Qnx%?Qr = Qnul%
1360 Qroot% = FNQ_put1(Qnx%, Qroot%)
1370 Qnx% = Qnx% + 1
1380 ENDPROC
1390 :
1400 DEFFNQ_put1(node%, tree%)
1410 LOCAL subtree%
1420 IF tree% = Qnul% THEN =node%
1430 IF FNhas_priority(node%, tree%) TH
EN subtree% = tree%?Ql : node%?Ql = tree
%?Qr : tree%?Ql = Qnul% : tree%?Qr = Qnu
1% : node%?Qr = FNQ_put1(tree%, subtree%
) : =node%
1440 subtree% = tree%?Ql
1450 tree%?Ql = tree%?Qr
1460 tree%?Qr = FNQ_put1(node%, subtree
%)
1470 =tree%
1480 :
1490 DEFPROCQ_get
1500 LOCAL result%
1510 result% = Qroot%
1520 Qroot% = FNremove_root(Qroot%)
1530 qz% = result%?Qz
1540 ql% = result%?Qd
1550 ENDPROC
1560 :
1570 DEFFNremove_root(tree%)
1580 tree% = FNrmv_rmost(tree%)
1590 IF rmost% = Qnul% THEN =Qnul%
1600 IF tree% = Qnul% THEN =Qnul%
1610 =FNreconstruct(rmost%, tree%?Ql, t
ree%?Qr)
1620 :
1630 DEFFNrmv_rmost(tree%)
1640 LOCAL subtree%, node%
1650 IF tree%?Qr = Qnul% THEN rmost% =
tree% : =Qnul%
1660 subtree% = tree%
1670 REPEAT
1680   rmost% = subtree%
1690   subtree% = subtree%?Qr
1700 UNTIL subtree% = Qnul%
1710 node% = tree%
1720 REPEAT
1730   subtree% = node%?Qr
1740   node%?Qr = node%?Ql
1750   IF subtree% = rmost% THEN node%?
Ql = Qnul% ELSE node%?Ql = subtree% : no
de% = subtree%
1760 UNTIL subtree% = rmost%
1770 =tree%
1780 :
1790 DEFFNreconstruct(nd%, ls%, rs%)
1800 LOCAL templ%, tempr%
1810 IF FNhas_priority(nd%, ls%) AND FN
has_priority(nd%, rs%) : nd%?Ql = ls% :
nd%?Qr = rs% : =nd%
1820 IF FNhas_priority(rs%, ls%) THEN t
empl% = rs%?Ql : tempr% = rs%?Qr : rs%?Q
l = ls% : rs%?Qr = FNreconstruct(nd%, te
mpl%, tempr%) :  =rs%
1830 templ% = ls%?Ql : tempr% = ls%?Qr
: ls%?Ql = FNreconstruct(nd%, templ%, te
mpr%) : ls%?Qr = rs% :  =ls%
1840 :
1850 DEFFNqueue_empty = (Qroot% = Qnul%
)
1860 :
1870 DEFFNshortest(z%)
1880 LOCAL x%, y%
1890 x% = z% MOD sz%
1900 y% = z% DIV sz%
1910 =FNlesser(FNlesser(x%, sz%-1-x%),F
Nlesser(y%, sz%-1-y%))
1920 :
1930 DEFFNlesser(x%,y%)
1940 IF x%<y% THEN =x% ELSE =y%
1950 :
1960 DEFFNhas_priority(n1%, n2%)
1970 IF n1% = Qnul% THEN =FALSE
1980 IF n2% = Qnul% THEN =TRUE
1990 = ((n1%?Qd + n1%?Qe) <= (n2%?Qd +
n2%?Qe))
2000 :
```

Listing 17 – Cumpstey

```
10 REM >Cumpstey (Info18)
20 REM Maze challenge routines
30 REM by Mike Cumpstey
40 :
50 DEF PROCsolve_setup
60 DIM map%(30,30),next%(3),pace%(3),
sx%(3),sy%(3),old%(3),new%(3),list%(99),
node%(999)
70 sx%(0)=1:sx%(1)=0:sx%(2)=-1:sx%(3)
=0
80 sy%(0)=0:sy%(1)=1:sy%(2)=0:sy%(3)=
-1
90 ENDPROC
100
110
120 DEF PROCsolve_newmaze
130 LOCALi%,j%
140 FORi%=0TO30
150  FORj%=0TO30
160   map%(i%,j%)=-1
170  NEXT
180 NEXT
190 FORi%=1TO29
200  FORj%=1TO29
210   map%(i%,j%)=0
220  NEXT
230 NEXT
240 FORi%=1TO8
250  k%=i%*2-1
260  FORj%=k%TO30-k%STEP2
270   map%(k%,j%)=-i%
280   map%(j%,k%)=-i%
290   map%(30-k%,j%)=-i%
300   map%(j%,30-k%)=-i%
310  NEXT
320 NEXT
330 FORi%=0TO999
340  node%(i%)=0
350 NEXT
360 step%=0
370 root%=-801
380 ENDPROC
390
400
410 DEF FNwhichway
420 LOCALx%,y%,n%,o%,mdir%
430 x%=manx%*2+1:y%=many%*2+1
440 mdir%=FNww6
450 IF n%+o%>2 THEN node%(step%)=x%+y%
*100+mdir%*10000 ELSE node%(step%)=0
460 =mdir%
470
480
490 DEF FNww6
500 LOCALd%,w%,i%,e%,l%,s%,t%,k%,block
%,built%,spot%,@%:@%=4
510 spot%=map%(x%,y%)
520
530 REM set up walls if a new square
540 IF spot%<0 THEN
550  step%+=1
560  PROCcutoff
570  FORd%=0TO3
580   IF FNwall(d%) THEN w%=-1 ELSE w%
=1
590   map%(x%+sx%(d%),y%+sy%(d%))=w%
600  NEXT
610  PROCaddin
620  map%(x%,y%)=step%
630 ELSE
640  step%=spot%
650 ENDIF
660
670 REM count all remaining exits
680 cut%=9
690 FORd%=0TO3
700  IF map%(x%+sx%(d%),y%+sy%(d%))=1
THEN
710   w%=map%(x%+sx%(d%)*2,y%+sy%(d%)*
2)
720   IF w%>0 THEN
730    k%=o%
740    IF o%>0 THEN
750     FORi%=o%-1TO0STEP-1
760      IF next%(i%)<w% THEN next%(i%
+1)=next%(i%):old%(i%+1)=old%(i%):k%=i%
770     NEXT
780    ENDIF
790    next%(k%)=w%:old%(k%)=d%:o%+=1
800   ELSE
810    IF w%<-900 THEN
820     map%(x%+sx%(d%),y%+sy%(d%))=-2
830    ELSE
840     IF w%<-800 THEN
850      map%(x%+sx%(d%),y%+sy%(d%))=-
1
860      cut%=d%:fork%=w%
870     ELSE
```

```
 880      pace%(n%)=w%:new%(n%)=d%:n%+=
1
 890     ENDIF
 900    ENDIF
 910   ENDIF
 920  ENDIF
 930 NEXT
 940
 950 REM no old exits indicates first m
ove standard for testing
 960 IFo%=0THEN=new%(0)
 970
 980 REM take old exit with one larger
step
 990 IF o%>0 AND next%(0)>step% THEN
1000  i%=o%:REPEATi%-=1:UNTIL next%(i%)
>step%
1010  =old%(i%)
1020 ENDIF
1030
1040 REM if new exit available then tak
e closest to edge
1050 IF n%>0 THEN
1060  c%=1:j%=0
1070  IF n%>1 THEN
1080   FORi%=1TOn%-1
1090    IF pace%(i%)=pace%(j%) THEN
1100     IF ABS(x%-15)=14 OR ABS(y%-15)
=14 THEN
1110      IF FNseek(new%(i%),x%,y%)<FNs
eek(new%(j%),x%,y%) THEN j%=i%
1120     ELSE
1130      c%+=1:IF FNrand(c%)=c% THEN j
%=i%
1140     ENDIF
1150    ELSE
1160     IF pace%(i%)>pace%(j%) THEN j%
=i%:c%=1
1170    ENDIF
1180   NEXT
1190  ENDIF
1200  =new%(j%)
1210 ENDIF
1220
1230 REM if blocked then retreat and bu
ild a wall take short cut if available
1240 IF o%=1 THEN
1250  IF cut%<9 THEN
1260   i%=next%(0)+1
1270   REPEAT i%-=1:UNTIL node%(i%)<>0
OR i%=1
1280   IF FNchecknode(node%(i%))=fork%
THEN =cut%
1290  ENDIF
1300  PROCbuild(old%(0)):=old%(0)
1310 ENDIF
1320
1330 REM loop found - search for any ne
w exit
1340 i%=next%(0)+1
1350 REPEAT i%-=1:fork%=FNchecknode(nod
e%(i%))
1360 UNTIL fork%<0 AND fork%>-800 OR i%
<next%(1)+2
1370 PROCbuild(old%(0))
1380 PROCbuild(old%(1))
1390 IF fork% THEN
1400  IF i%*2<next%(0)+next%(1) THEN
1410   PROCblock(node%(i%))
1420  ELSE
1430   =old%(0)
1440  ENDIF
1450 ELSE
1460  PROCblock(node%(next%(1)))
1470 ENDIF
1480 step%=next%(1)+1
1490 map%(x%,y%)=step%
1500 =old%(1)
1510
1520
1530 DEFFNbuild(d%)
1540 map%(x%+sx%(d%),y%+sy%(d%))=-2
1550 built%=TRUE
1560 =d%
1570
1580
1590 DEFPROCbuild(d%)
1600 map%(x%+sx%(d%),y%+sy%(d%))=-2
1610 ENDPROC
1620
1630
1640 DEFFNrand(range%)=RND(range%)
1650
1660
1670 DEFFNchecknode(val%)
1680 LOCALx%,y%,d%,f%
1690 IF val%<1 THEN =FALSE
1700 x%=val%MOD100:y%=val%DIV100MOD100
1710 FORd%=0TO3
1720  IF map%(x%+sx%(d%),y%+sy%(d%))=1
 THEN
1730   w%=map%(x%+sx%(d%)*2,y%+sy%(d%)*
2)
1740   IF w%<0 AND w%>-900 THEN f%=w%
1750  ENDIF
1760 NEXT
1770 =f%
1780
1790
1800 DEFPROCblock(val%)
1810 LOCALx%,y%,d%:x%=val%MOD100:y%=val
%DIV100MOD100:d%=val%DIV10000
1820 map%(x%+sx%(d%),y%+sy%(d%))=-2
1830 ENDPROC
1840
1850
1860 DEFFNseek(d%,x%,y%)
1870 REM search round edge for nearest
old
1880 LOCALc%,s%,k%:k%=d%DIV2
1890 s%=(x%DIV29+y%DIV29)*2+(ABS(y%-15)
)DIV14-d%
1900 REPEAT
1910  c%+=1:x%+=sx%(d%)*2:y%+=sy%(d%)*2
1920  IF ABS(x%-15)+ABS(y%-15)>27 THEN
d%=d%+s%AND3
1930 UNTIL map%(x%,y%)>0
1940 =c%
1950
1960
1970 DEFPROCcutoff
1980 REM adjust exit distances to edge
1990 LOCALu%,v%,p%,q%,k%,i%,n%,save%
2000 REM build a list of points needing
 update
2010 list%(0)=x%+y%*100:len%=1
2020 REPEAT
2030  u%=list%(k%)MOD100:v%=list%(k%)DI
V100:k%+=1
2040  n%=map%(u%,v%):map%(u%,v%)=-999
2050  FORi%=0TO3
2060   p%=u%+sx%(i%)*2:q%=v%+sy%(i%)*2
2070   IF ABS(p%-15)<16 AND ABS(q%-15)<
16 THEN PROCsquare
2080  NEXT
2090 UNTILk%=len%
2100 ENDPROC
2110
2120
2130 DEFPROCaddin
2140 REM update the map
2150 LOCALk%,m%,u%,v%,p%,q%,e%,w%
2160 map%(x%,y%)=999
2170 REPEAT
2180  k%+=1:IF k%>=len% THEN UNTILTRUE:
ENDPROC
2190  u%=list%(k%)MOD100:v%=list%(k%)DI
V100
2200  m%=-910:e%=0
2210  FORi%=0TO3
2220   p%=u%+sx%(i%)*2:q%=v%+sy%(i%)*2:
w%=map%((p%+u%)DIV2,(q%+v%)DIV2)
2230   IF w%=0 THEN
2240    IF map%(p%,q%)<0 AND map%(p%,q%
)>m% THEN m%=map%(p%,q%)
2250   ELSE
2260    IF w%>0 THEN e%+=1
2270   ENDIF
2280  NEXT
2290  IF e%>1 AND m%<-900 THEN m%=root%
:root%-=1
2300  map%(u%,v%)=m%-1
2310 UNTILFALSE
2320
2330
2340 DEFPROCsquare
2350 REM check if it needs adjusting
2360 IF map%(p%,q%)<>n%-1 THEN ENDPROC
2370 LOCALg%,h%,m%,w%,j%:m%=-999
2380 FORj%=0TO3
2390  g%=p%+sx%(j%)*2:h%=q%+sy%(j%)*2
2400  IF map%((p%+g%)DIV2,(q%+h%)DIV2)>
=0 THEN
2410   IF map%(g%,h%)<0 AND map%(g%,h%)
>m% THEN m%=map%(g%,h%)
2420  ENDIF
2430 NEXT
2440 IF m%<n% THEN list%(len%)=p%+q%*10
0:len%+=1
2450 ENDPROC
2460
2470 REM ————————— End o
f Program
```

Listing 18 – BAU

```
  10 REM >BAU (Info19)
  20 REM Our own maze challenge routine
s
  30 REM by DA
  40 :
  50 DEF PROCsolve_setup
  60 DIM log% size%*size%,way% size%*si
ze%,seen% size%*size%
  70 ENDPROC
  80 :
  90 DEF PROCsolve_newmaze
 100 LOCAL i%,j%
 110 FOR i%=0 TO size%*size%-1 STEP 4
 120  log%!i%=-1
 130  way%!i%=0
 140  seen%!i%=0
 150 NEXT
 160 ENDPROC
 170 :
 180 DEF FNwhichway
 190 LOCAL i%,j%,d%
 200 log%?(manx%+size%*many%)=0
 210 FOR d%=0 TO 3
 220  IF FNwall(d%) THEN log%?(manx%+si
ze%*many%)=log%?(manx%+size%*many%)+2^d%
 230 NEXT
 240 dir%=-1
 250 best=0
 260 FOR d%=0 TO 3
 270  IF NOT FNwall(d%) THEN
 280   count=0
 290   FOR i%=0 TO size%*size%-1 STEP 4
 300    seen%!i%=0
 310   NEXT
 320   PROCcount(manx%+dx%(d%),many%+dy
%(d%),1)
 330   IF count>best best=count:dir%=d%
 340  ENDIF
 350 NEXT
 360 IF dir%=-1 THEN
 370  dir%=way%?(manx%+size%*many%) EOR
 2
 380 ELSE
 390  way%?(manx%+dx%(dir%)+size%*(many
%+dy%(dir%)))=dir%
 400 ENDIF
 410 =dir%
 420 :
 430 DEF PROCcount(i%,j%,depth%)
 440 LOCAL q%
 450 IF seen%?(i%+size%*j%) THEN ENDPRO
C
 460 IF log%?(i%+size%*j%)<>255 THEN EN
DPROC
 470 IF i%=0 OR i%=size%-1 OR j%=0 OR j
%=size%-1 THEN count=count+1/(depth%^1.4
):ENDPROC
 480 seen%?(i%+size%*j%)=TRUE
 490 PROCcount(i%,j%-1,depth%+1)
 500 PROCcount(i%,j%+1,depth%+1)
 510 PROCcount(i%-1,j%,depth%+1)
 520 PROCcount(i%+1,j%,depth%+1)
 530 ENDPROC
```

Listing 19 – Pearls

```
  10 REM >Pearls (Info20)
  20 REM by Jan Vibe
  30 REM for 32-bit machines
  40 REM (c) BAU January 1993
  50 :
  60 MODE 12
  70 OFF
  80 DIM c%(15,3),a%(4),spr &10000
  90 spr!0=&FFFF
 100 spr!4=0
 110 spr!8=16
 120 spr!12=16
 130 r%=128
 140 cr%=40
 150 b%=2*r%
 160 ms%=r%-cr%
 170 d%=(r%*1.1)/15
 180 ti%=TIME
 190 FOR y%=0 TO b% STEP 4
 200 FOR x%=0 TO b% STEP 2
 210 c%=(SQR((x%-r%)^2+(y%-r%)^2)-RND(2
*d%)+d%)/d%
 220 IF c%>15 c%=15
 230 IF c%<1 c%=1
 240 GCOL c%
 250 POINT x%,y%
 260 PROCf
 270 NEXT
 280 NEXT
 290 SYS "OS_SpriteOp",256+16,spr,"ball
",0,0,0,2*r%,2*r%
 300 SYS "OS_SpriteOp",256+29,spr,"ball
"
 310 :
 320 ON ERROR PROCerr
 330 REPEAT
 340 FOR n%=1 TO 4
 350 a%(n%)=RND(9)
 360 NEXT
 370 CLS
 380 FOR n=0 TO 360
 390 s=SINRAD(a%(1)*n)*COSRAD(a%(2)*n)
 400 c=SINRAD(a%(3)*n)*COSRAD(a%(4)*n)
 410 SYS "OS_SpriteOp",256+61,spr,"ball
",0
 420 GCOL 0
 430 RECTANGLE FILL 0,0,2*r%
 440 GCOL 15
 450 f%=0
 460 PROCf
 470 cx%=ms%*s+r%
 480 cy%=ms%*c+r%
 490 CIRCLE FILL cx%,cy%,cr%
 500 SYS "OS_SpriteOp",256+61,spr,0,0
 510 OFF
 520 x%=580*s+640
 530 y%=450*c+512
 540 SYS "OS_SpriteOp",256+34,spr,"ball
",x%-cx%,y%-cy%,8
 550 PROCf
 560 NEXT
 570 k%=TIME+1000
 580 REPEAT
 590 PROCf
 600 UNTIL TIME>k%
 610 UNTIL FALSE
 620 :
 630 DEF PROCf
 640 LOCAL n%,t%,f%
 650 IF TIME-ti%>=6 THEN
 660 FOR f%=1 TO 3
 670 FOR n%=15 TO 2 STEP -1
 680 c%(n%,f%)=c%(n%-1,f%)
 690 NEXT
 700 c%(0,f%)=(c%(0,f%)+RND(22)+10)MOD3
60
 710 c%(1,f%)=127*(SINRADc%(0,f%)+1)
 720 NEXT
 730 FOR n%=1 TO 15
 740 COLOUR n%,c%(n%,1),c%(n%,2),c%(n%,
3)
 750 NEXT
 760 ti%=TIME
 770 ENDIF
 780 ENDPROC
 790 :
 800 DEF PROCerr
 810 SYS "OS_SpriteOp",256+61,spr,0,0
 820 REPORT
 830 PRINT" at line "STR$ERL
 840 ON
 850 END
```

Listing 20 – Pearls2

```
  10 REM >Pearls2 (Info21)
  20 REM by Jan Vibe
  30 REM for 32-bit machines
  40 REM (c) BAU January 1993
  50 :
  60 MODE 15
  70 MODE 9
  80 OFF
  90 DIM a%(4),spr &10000
 100 spr!0=&FFFF
 110 spr!4=0
 120 spr!8=16
 130 spr!12=16
 140 s1%=1
 150 s2%=2
 160 r%=100
 170 cr%=48
 180 b%=2*r%
 190 ms%=r%-cr%
 200 d%=(r%*1.1)/15
 210 FOR n%=1 TO 15
 220 COLOUR 16-n%,16*n%,16*n%,16*n%
 230 NEXT
 240 COLOUR 0,0,0,240
 250 VDU 19,0,24,0,0,240
 260 FOR y%=0 TO b% STEP 4
 270 FOR x%=0 TO b% STEP 4
 280 c%=(SQR((x%-r%)^2+(y%-r%)^2)-RND(2
*d%)+d%)/d%
 290 IF c%>15 c%=15
 300 IF c%<1 c%=1
 310 GCOL c%
 320 POINT x%,y%
 330 NEXT
 340 NEXT
 350 SYS "OS_SpriteOp",256+16,spr,"ball
",0,0,0,2*r%,2*r%
 360 SYS "OS_SpriteOp",256+29,spr,"ball
"
 370 :
 380 ON ERROR PROCerr
 390 REPEAT
 400 SYS "OS_SpriteOp",256+61,spr,"ball
",0
 410 GCOL 0
 420 RECTANGLE FILL 0,0,2*r%
 430 GCOL 15
 440 CIRCLE FILL r%,r%,cr%
 450 SYS "OS_SpriteOp",256+61,spr,0,0
 460 OFF
 470 FOR n%=1 TO 4
 480 SYS 6,112,s1%
 490 SYS 6,113,s2%
```

```
  500 CLS
  510 s1%=s1% MOD 4+1
  520 s2%=s2% MOD 4+1
  530 SYS "OS_SpriteOp",256+34,spr,"ball
",640-r%,512-r%,8
  540 NEXT
  550 FOR n%=1 TO 4
  560 a%(n%)=RND(8)
  570 NEXT
  580 FOR n=0 TO 360 STEP 0.25
  590 s=SINRAD(a%(1)*n)*COSRAD(a%(2)*n)
  600 c=SINRAD(a%(3)*n)*COSRAD(a%(4)*n)
  610 SYS "OS_SpriteOp",256+61,spr,"ball
",0
  620 GCOL 0
  630 RECTANGLE FILL 0,0,2*r%
  640 GCOL 15
  650 cx%=(ms%*s+r%)>>2
  660 cy%=(ms%*c+r%)>>2
  670 CIRCLE FILL cx%<<2,cy%<<2,cr%
  680 SYS "OS_SpriteOp",256+61,spr,0,0
  690 OFF
  700 SYS 6,112,s1%
  710 SYS 6,113,s2%
  720 WAIT
  730 s1%=s1% MOD 4+1
  740 s2%=s2% MOD 4+1
  750 x%=(580*s+640)>>2
  760 y%=(450*c+512)>>2
  770 SYS "OS_SpriteOp",256+34,spr,"ball
",(x%-cx%)<<2,(y%-cy%)<<2,8
  780 NEXT
  790 k%=TIME+1000
  800 REPEAT
  810 SYS 6,112,s1%
  820 SYS 6,113,s2%
  830 WAIT
  840 s1%=s1% MOD 4+1
  850 s2%=s2% MOD 4+1
  860 SYS "OS_SpriteOp",256+34,spr,"ball
",640-r%,512-r%,8
  870 UNTIL TIME>k%
  880 UNTIL FALSE
  890 :
  900 DEF PROCerr
  910 SYS "OS_SpriteOp",256+61,spr,0,0
  920 SYS 6,112,s1%
  930 REPORT
  940 PRINT" at line "STR$ERL
  950 ON
  960 END
```

Listing 21 – Parallel

```
   10 REM >Parallel (Info22)
   20 REM By DL
   30 REM For RISC OS 3
   40 REM (C) BAU January 1993
   50 :
   60 MODE 12:OFF
   70 SYS "OS_SWINumberFromString",,"OS_
SpriteOp" TO spop
   80 DIM spr 100*1024,dest 32
   90 spr=100*1024
  100 spr!8=16
  110 SYS spop,&109,spr
  120 FOR i=0 TO 15
  130 COLOUR i,i<<4,i<<6,i<<3
  140 NEXT
  150 PROCpattern(0,0,640,512)
  160 SYS spop,&110,spr,"pat",,0,0,640-1
,512-1
  170 MOUSE ON
  180 MOUSE TO 640,512
  190 MOUSE ox,oy,z
  200 REPEAT
  210 MOUSE x,y,z
  220 IF x<>ox OR y<>oy THEN
  230 dest!0 =0  <<8 :dest!4=0<<8
  240 dest!8 =640<<8 :dest!12=(y-512)<<8
  250 dest!16=  x<<8 :dest!20=y<<8
  260 dest!24=(x-640)<<8:dest!28=512<<8
  270 WAIT:CLS
  280 SYS "OS_SpriteOp",&138,spr,"pat",1
,,,dest
  290 ox=x
  300 oy=y
  310 ENDIF
  320 UNTIL 0
  330 END
  340 :
  350 DEF PROCpattern(x1,y1,x2,y2)
  360 VDU 24,x1;y1;x2;y2;
  370 rad=0
  380 col=0
  390 REPEAT
  400 GCOL 3,col
  410 col=(col+1)MOD15
  420 CIRCLE FILL x1,y1,rad
  430 CIRCLE FILL x1,y2,rad
  440 CIRCLE FILL x2,y1,rad
  450 CIRCLE FILL x2,y2,rad
  460 rad+=16
  470 UNTIL rad>(x2-x1) AND rad>(y2-y1)
  480 VDU 26
  490 ENDPROC
```

Listing 22 – Twist

```
   10 REM >Twist (Info23)
   20 REM By DL
   30 REM For RISC OS 3
   40 REM (C) BAU January 1993
   50 :
   60 desk=(FNvar("Wimp$State")="desktop
")
   70 IF NOT desk PROCscreen
   80 SYS "OS_SWINumberFromString",,"OS_
SpriteOp" TO spop
   90 DIM spr 512*1024,mat 32
  100 mul=1<<16
  110 !spr=512*1024
  120 spr!8=16
  130 SYS spop,&109,spr
  140 PROCscrsize
  150 REPEAT
  160 REPEAT
  170 x%=RND(1280)
  180 y%=RND(1024)
  190 r%=RND(100)+50
  200 UNTIL x%-r%>0 AND y%-r%>0 AND x%+r
%<xsize AND y%+r%<ysize
  210 a%=(RND(1)*3+1)*SGNRND
  220 s%=RND(3):IF INKEY-1 s%=r%
  230 IF NOT INKEY-99 PROCturn(x%,y%,r%,
a%,s%) ELSE PROCcols
  240 UNTIL 0
  250 END
  260 :
  270 DEF FNvar(var$)
  280 LOCAL buf
  290 DIM buf 32
  300 SYS "OS_ReadVarVal",var$,buf,32 TO
 ,,cr
  310 buf?cr=13
  320 =$buf
  330 :
  340 DEF PROCscreen
  350 MODE 12:OFF
  360 DIM r(15),g(15),b(15)
  370 FOR col=0 TO 15
  380 r(col)=&FF
  390 g(col)=col OR (col<<4)
  400 b(col)=0
  410 NEXT
  420 base=0
  430 PROCcols
  440 maxr=SQR(640*640+512*512)
  450 c=0
  460 FOR r=maxr TO 0 STEP -4
  470 PROCcols
  480 GCOL c
  490 CIRCLE FILL 640,512,r
  500 c+=1
  510 IF c=16 c=0
  520 NEXT
  530 ENDPROC
  540 :
  550 DEF PROCcols
  560 IF desk ENDPROC
  570 WAIT
  580 FOR v=0 TO 15
  590 COLOUR v,r((v+base) MOD 16),g((v+b
ase) MOD 16),b((v+base) MOD 16)
  600 NEXT
  610 base=(base+1)MOD16
  620 ENDPROC
  630 :
  640 DEF PROCscrsize
  650 SYS "OS_ReadModeVariable",-1,4 TO
 ,,xeig
  660 SYS "OS_ReadModeVariable",-1,5 TO
 ,,yeig
  670 SYS "OS_ReadModeVariable",-1,11 TO
 ,,xsize
  680 SYS "OS_ReadModeVariable",-1,12 TO
 ,,ysize
  690 xsize=xsize<<xeig
  700 ysize=ysize<<yeig
  710 ENDPROC
  720 :
  730 DEF PROCturn(x,y,size,aa,s)
  740 SYS spop,&110,spr,"x",,x-size,y-si
ze,x+size,y+size
  750 SYS spop,&11D,spr,"x"
  760 a=0
  770 rr=size
  780 rad=size
  790 REPEAT
  800 SYS spop,&13D,spr,"x"
  810 CLG
  820 GCOL 63 TINT 192
  830 CIRCLE FILL size,size,rad
  840 SYS spop,&13C,spr,,1
  850 mat!0=COSRAD(a)*mul
  860 mat!4=SINRAD(a)*mul
  870 mat!8=-SINRAD(a)*mul
  880 mat!12=COSRAD(a)*mul
  890 mat!16=(x-rr*COSRAD(-a)-rr*SINRAD(
-a))<<8
  900 mat!20=(y+rr*SINRAD(-a)-rr*COSRAD(
-a))<<8
  910 SYS spop,&138,spr,"x",%00,,8,mat
  920 rad-=(4*s)
  930 a+=aa
  940 PROCcols
  950 UNTIL rad<0
  960 ENDPROC
```

Listing 23 – IFS2(new)

```
DEF PROCfindifs
OSCLI"Dir "+ifsdir$
file=0
ifss=0
REPEAT
 n$=FNnextname
 IF n$<>"" ifss=ifss+1
UNTIL n$=""
file=0
DIM ifs$(ifss-1),file$(ifss-1)
FOR i=0 TO ifss-1
 file$(i)=FNnextname
 in=OPENIN(file$(i))
 ifs$(i)=FNline(in)
 CLOSE #in
NEXT
IF dfs OSCLI"Dir $" ELSE OSCLI"Dir ^"
ENDPROC
:
DEF FNnextname
IF arc SYS "OS_GBPB",8,,name,1,file TO
,,,notread,file ELSE PROCbbc_gbpb
IF notread=0
?(name+?name+1)=13:n$=$(name+1) ELSE
n$=""
=n$
:
DEF PROCbbc_gbpb
block!1=name
block!5=1
block!9=file
X%=block MOD 256
Y%=block DIV 256
A%=8
CALL &FFD1
notread=block!5
file=block!9
ENDPROC
```

A STITCH IN REAL TIME

Listing 1 – Knitfiles

```
   10 REM >KnitFiles (Knitting1)
   20 REM Create files for !Knit
   30 REM by DCA
   40 REM for 32-bit machines
   50 REM (c) BAU January 1993
   60 :
   70 free%=(HIMEM-END-&8000) AND &FFFFF
000
   80 DIM q% &100,w% free%
   90 *CDIR Symbols
  100 REPEAT
  110 READ file$
  120 IF file$<>"*" THEN
  130 PRINT file$
  140 READ type%,olen%
  150 IF type%=&FFF OR type%=&FFE OR typ
e%=&FEB THEN
  160 out%=OPENOUT(file$)
  170 REPEAT
  180 READ line$
  190 IF line$<>"*" BPUT#out%,line$
  200 UNTIL line$="*"
  210 CLOSE#out%
  220 SYS "OS_File",18,file$,type%
  230 ELSE
  240 line%=0
  250 d$=""
  260 i%=0
  270 WHILE i%<olen%
  280 b$=FNc
  290 IF b$>="a" AND b$<="z" THEN
  300 off%=-EVAL("&"+FNc+FNc)
  310 FOR k%=0 TO (ASC(b$)-ASC"a"+2)
  320 w%?i%=w%?(i%+off%)
  330 i%+=1
  340 NEXT
  350 ELSE
  360 w%?i%=EVAL("&"+b$+FNc)
  370 i%+=1
  380 ENDIF
  390 ENDWHILE
  400 SYS "OS_File",10,file$,type%,,w%,w
%+olen%
  410 ENDIF
  420 ENDIF
  430 UNTIL file$="*"
  440 END
  450 :
  460 DEF FNc
  470 LOCAL c$
  480 IF d$="" THEN
  490 READ d$,ch$
  500 line%+=1
  510 $q%=d$
  520 SYS "OS_CRC",0,q%,q%+LEN(d$),1 TO
crc%
  530 IF crc%<>EVAL("&"+ch$) PRINT"Error
 in data line ";line%:END
  540 ENDIF
  550 c$=LEFT$(d$,1)
  560 d$=MID$(d$,2)
  570 =c$
  580 :
  590 DATA "!Run",&FEB,&A0
  600 DATA wimpslot -min 320K
  610 DATA set Knit$Dir <Obey$Dir>
  620 DATA set KnitDraw$Dir <Obey$Dir>.^
.Draw
  630 DATA set KnitText$Dir <Obey$Dir>.^
.Text
  640 DATA set KnitSprite$Dir <Obey$Dir>
.^.Sprite
  650 DATA <Knit$Dir>.KnitTwo
  660 DATA *
  670 DATA "!Sprites",&FF9,&2E0
  680 DATA 010000010a04E4020000D4,5270
  690 DATA a04216B6E6974a14a170004,CDA4
  700 DATA e1Cb0F07a282Ca2C80a310C,8DB9
  710 DATA a3477777777a04d07b0Da48,C21A
  720 DATA 8788888888a04a07B8BBa0C,84EF
  730 DATA 78j148Cc13k14CCBCc13h28,386A
  740 DATA a118Cd13i3CCCBCBC8Bm14C,6937
  750 DATA CCBCCBBa3Db17e64B8BBCCB,7421
  760 DATA BBBb168CB88Bf78CCa38B88,6F12
  770 DATA 8B8CBa67CCd8CB8BBBBCC8B,36E1
  780 DATA BBBBBBBB88BBBCCCCCBB7Bb,7175
  790 DATA B4CCCCBC88B88Ba12BB8BB8,2009
  800 DATA C8CCCB7CaFCC7a148BB888a,30BB
  810 DATA 11a2CB88Be148Cb23a3Ea55,9684
  820 DATA BB888Bb3CC78C88b37a88b5,5F8C
  830 DATA 4BBd50bFDB8a51a65a5488g,9BA0
  840 DATA 14d23b3Fc7877777777a04d,F53B
  850 DATA 07b0DaF0FFFFFFFFa04d07j,8435
  860 DATA 0Dv19z31z4Dz69z85zA1zBD,19A8
  870 DATA zD9zF5zFFzFFhFFFF,E6F2
  880 DATA "symbols.0",&AFF,&28
  890 DATA 44726177C900000000a04b0,E479
  900 DATA C2020202 0a0420FFFFFF7Fa,63A4
  910 DATA 047Fa1B80a1F80,83F2
  920 DATA "symbols.1",&AFF,&6C
  930 DATA 44726177C900000000a04b0,E479
  940 DATA C20202020a04201856000 0a,EC6C
  950 DATA 0400887Ea04a0402b20a28n,65C5
  960 DATA 18FFFFFFFFc3F0500005600,4F6A
  970 DATA 1020b28985800000 87Ca04a,5679
  980 DATA 58b08b10a6300,74DE
  990 DATA "symbols.2",&AFF,&B0
 1000 DATA 44726177C900000000a04b0,E479
 1010 DATA C20202020a042018560000a,EC6C
 1020 DATA 0400887Ea04a0402b20a28n,65C5
 1030 DATA 18FFFFFFFFc3F0500005600,4F6A
 1040 DATA 1020b289858000000 87Ca04a,5679
 1050 DATA 58b08b10b63z44n44c40e44,7B1F
 1060 DATA b50e4400,E0F0
 1070 DATA "symbols.3",&AFF,&98
 1080 DATA 44726177C900000000a04b0,E479
 1090 DATA C20202020a04200052000 0E,4561
 1100 DATA 257a197F0000807D000002a,F528
 1110 DATA 2470b28m18FFFFFFFFc3F05,855E
 1120 DATA 000056001020b288054a516,6FC4
 1130 DATA 3000006b0C5Ba5D61a4460a,1951
 1140 DATA 655Ea4C62a6D59d1CCC6600,CD8D
 1150 DATA 00C4a55806Ea8176a687Ca8,B9FA
 1160 DATA 97Bc8D00,F617
 1170 DATA "symbols.4",&AFF,&180
 1180 DATA 44726177C900000000a04b0,E479
 1190 DATA C20202020a042073610000a,4834
 1200 DATA 04002B73a04a0402a24ACa2,8962
 1210 DATA 8506Aa04a04e0800FFFFFFF,B197
 1220 DATA Fe3F0042001020b28f2406q,F6FB
 1230 DATA 30y1Cz38z54g9405eC8fACn,EA3
 1240 DATA C4fA8jAC9370a04a04bAC1E,CDCC
 1250 DATA 6D000009740000 8167d080C,1DBE
 1260 DATA 64h1C9660d20b08b20b1Cb2,E055
 1270 DATA 0bE4b30j20b54f1Cj50b60f,ED27
 1280 DATA 70eAC00,C7FE
 1290 DATA "symbols.5",&AFF,&D4
 1300 DATA 44726177C900000000a04b0,E479
 1310 DATA C20202020a04205F5500005,48D9
 1320 DATA F5400003F7Fa0480000002a,FC56
 1330 DATA 24ACa28n18FFFFFFFFb3F80,6AB2
 1340 DATA a2142001020b283B780000F,7489
```

```
1350 DATA 0a0406a588B700000058100,7A7A
1360 DATA 001464d08645Ch1CB3a60DC,296D
1370 DATA a20b08C363d1CAF5Bd38b30,49D0
1380 DATA 9A53d40b08b54f1CECa94b3,49C0
1390 DATA 0b08b40f7005dC800,702A
1400 DATA "symbols.6",&AFF,&D4
1410 DATA 44726177C900000000a04b0,E479
1420 DATA C20202020a04205F5500005,48D9
1430 DATA F5400003F7Fa0480000002a,FC56
1440 DATA 24ACa28n18e3B0080a21420,6BCC
1450 DATA 01020b283B780000F0a0406,85DC
1460 DATA a588B7000000058100001464,F417
1470 DATA d08645Ch1CB3a60DCa20b08,282C
1480 DATA C363d1CAF5Bd38b309A53d4,4057
1490 DATA 0b08b54f1CECa94b30b08b4,AFD0
1500 DATA 0f7005dC800,B7A9
1510 DATA "symbols.7",&AFF,&94
1520 DATA 44726177C900000000a04b0,E479
1530 DATA C20202020a042098580000a,20A
1540 DATA 0400087Ca04a0402a246Ca2,601C
1550 DATA 8n18e3Bc4242001020b28g3,ABB3
1560 DATA Ca58b40i0Cd50e48i0Cc6C0,A50E
1570 DATA 5d8800,D4EC
1580 DATA *
```

Listing 2 – KnitSpr

```
10 REM >KnitSpr (Knitting2)
20 REM Creates demo design
30 REM by DCA
40 REM for 32-bit machines
50 REM (c) BAU January 1993
60 :
70 DIM q% &100,w% 5000
80 READ olen%
90 line%=0
100 d$=""
110 i%=0
120 WHILE i%<olen%
130 b$=FNc
140 IF b$>="a" AND b$<="z" THEN
150 off%=-EVAL("&"+FNc+FNc)
160 FOR k%=0 TO (ASC(b$)-ASC"a"+2)
170 w%?i%=w%?(i%+off%)
180 i%+=1
190 NEXT
200 ELSE
210 w%?i%=EVAL("&"+b$+FNc)
220 i%+=1
230 ENDIF
240 ENDWHILE
250 out%=OPENOUT"Demo"
260 FOR i%=0 TO olen%-1 STEP 2
270 FOR j%=0 TO i%?w%-1
280 BPUT#out%,i%?(w%+1)
290 NEXT
300 NEXT
310 CLOSE#out%
320 SYS "OS_File",18,"Demo",&FF9
330 PRINT"'Demo' created"
340 END
350 :
360 DEF FNc
370 LOCAL c$
380 IF d$="" THEN
390 READ d$,ch$
400 line%+=1
410 $q%=d$
420 SYS "OS_CRC",0,q%,q%+LEN(d$),1 TO crc%
430 IF crc%<>EVAL("&"+ch$) PRINT"Error in data line ";line%:END
440 ENDIF
450 c$=LEFT$(d$,1)
460 d$=MID$(d$,2)
470 =c$
480 :
490 DATA &10AE
500 DATA 010103000110a041401A002,9298
510 DATA 000104c066A0175016D0170,1867
520 DATA 0165017206000120a229A07,D5EF
530 DATA 00010Fa2A2Ca2E180150a2A,3C5
540 DATA 0DFF00FF00B10019FF20a04,6FA2
550 DATA 32e08e08m10b201AFF1Ea04,B086
560 DATA e08a301BFF1Ca04e08a401C,D6D5
570 DATA FF1Aa04e08a5052a54a04e0,B20
580 DATA 8m10i2005FF034F01a04a04,AA4A
590 DATA e08m10z20i3C06aC406FF01,FAEE
600 DATA a4Ca04e08i0Cu18z30z4Cz6,B3A
610 DATA 8h8405zE0zE0uE052aE4a04,602D
620 DATA e08m10a6C08aFC07aFCa04e,BEA4
630 DATA 08m10aFC09a9407a94b98b9,7E3A
640 DATA Ce08m10034F08z50m50r980,8BA3
650 DATA Cz8CaA80DaD00Bz88aFC0Cz,B5E7
660 DATA 48i48r80b94zC0jC007z88e,3084
670 DATA A408z50k50310054FF30a04,7477
680 DATA 2F0056FF2Ea042D0058FF2C,905A
690 DATA a042B005AFF2Aa04240066F,884F
700 DATA F1Ea04a04a0803aFC01aFCa,8A21
710 DATA 04e08m10z20z3Ce5804a6C0,286C
720 DATA 4aFC01aFCa04e08m10z20z3,E772
730 DATA Cz58z74z90qAC03aC403zFC,CC4D
740 DATA y1Cz34j5004a6466a68a04e,866B
750 DATA 08m10i2030FF056031a942E,A00E
760 DATA FF086030a9C2DFF0B602EaA,224
770 DATA 42CFF0Ce080D602DaB42BFF,4674
780 DATA 0F602Ce08b0816FF046010F,E916
790 DATA F11a04046017aD415FF0660,3299
800 DATA 0Fa100Fa0816c1007600DFF,F685
810 DATA 13600Ea0815aF414FF09600,CD13
820 DATA Ca100Da0814m10f100BFF15,C23C
830 DATA a24d2013a880Aa100Ba9013,FED7
840 DATA m10m10w2009FF17a44d4027,6D9B
850 DATA a0C28q18n28bA80Aa380BeA,F8A
860 DATA 8bC82EeC416FF056030a04b,C54E
870 DATA E013FF036002FF01aE419a6,B40D
880 DATA 8d0C18aF818a180Ca780Fa2,298A
890 DATA 0b281Ba28b8812a30bC828a,E511
900 DATA E429e08b0829FF13602AaF0,3BE8
910 DATA 2AFF11602BaF82BFF0F602C,6E69
920 DATA aF02CFF0D602DaF82Ea902F,4C12
930 DATA aF032a6C33cC8066005e0C2,C2F5
940 DATA Ca9Cb1431cA41E0034aACb4,BE9D
950 DATA 437a24b643AaA4b6C66aF8a,A983
960 DATA 04e0811003FF034F01a04a0,C887
970 DATA 4e08m10z20z3Ce5804aF404,DED7
980 DATA FF01a64a04e08i0Cu18z30z,72A0
990 DATA 4Cz68z84zA0014F03FF1F00,9239
1000 DATA 02zFCy1Cz34j5003FF20006,CF50
1010 DATA 4a04a04c080DaFC10aFCa04,6A67
1020 DATA e08014F12u1812FF21000Ba,75E9
1030 DATA A00EaA4a04e0803a4022000,A0AC
1040 DATA Cq4811a180AFF054F0Ca04a,86E3
1050 DATA 04e08054F0Fy3009FF074F0,1EC4
1060 DATA Aa04a04e0807a70v6023000,A8CB
1070 DATA 7FF094F08a04a04e0809a70,4C2B
1080 DATA 24aA8pD810a1806FF0B4Fa0,6068
1090 DATA 4a04e08a100By30v4860FF2,A84E
1100 DATA 5005EFF260003FF034F01a0,FC39
1110 DATA 4a04e08m10z20y3C04a5C04,5E4
1120 DATA aF401aF8a04e08m10z20z3C,AC6F
1130 DATA z58z74z90aAC03aB403zFCz,E28B
1140 DATA FCz38a5404a5C5Ea605EFF9,1B
1150 DATA 60002FF82a04a04e0802FF1,B0AD
1160 DATA 80019FF20a0418i0Ci0Cu18,365C
1170 DATA f301AFF1Ea04i0Ce481BFF1,E6FE
1180 DATA Ca04i0Ce601CFF1Aa04i0Ce,8BEE
1190 DATA 7852e80e08m10z20z40z58z,A146
1200 DATA 78z90zB0zC8zE8zF8zF8nF8,60B0
1210 DATA 170054a04e08aF8160056a0,90C2
1220 DATA 4e08aF8150058a04e08aF81,31B3
1230 DATA 4005Aa04e08aF80E0066a04,6ED5
1240 DATA e08m10u18z30z50z68z88zA,5F0F
1250 DATA 0zC0zD8zF8zF8zF8zF8zF8z,437
1260 DATA F8zF8zF8zF8zF8FF0F0064a,278F
1270 DATA 04e08m10r18100062a04e08,CD71
1280 DATA m10r1811006 0a04e08m10r1,EF9D
1290 DATA 812005Ea04e08m10q18FF,5155
1300 DATA *
```

Listing 3 – KnitTwo

```
10 REM >KnitTwo (Knitting3)
20 REM by Dave Acton
30 REM based on KnitOne by Joan Barnard
40 REM for 32-bit machines only
50 REM (c) BAU January 1993
60 :
70 PROCinit
80 PROCinit_font
90 PROCget_sprite
100 PROCinit_map
110 PROCexamine
120 PROCinput_cols
130 PROCmake_draw
140 PROCsave_draw
150 PROCmake_text
160 PROCtidy_up
170 END
180 :
190 DEF PROCsave_draw
200 SYS "OS_File",10,"<KnitDraw$Dir>."+file$,&AFF,,draw_file%,p%
210 ENDPROC
220 :
230 DEF PROCmake_draw
240 LOCAL x%,y%,xx%,yy%,xe%,ye%,m%,i%
250 PRINT'"Making drawfile..."
260 p%=draw_file%+40
270 PROCadd_font_list
280 FOR y%=0 TO knit_height%-1 STEP block_size%
290 FOR x%=0 TO knit_width%-1 STEP block_size%
300 ye%=y%+block_size%
310 IF ye%>knit_height% ye%=knit_height%
320 head%()=-1
330 FOR yy%=y% TO ye%-1
340 xe%=x%+block_size%
350 IF xe%>knit_width% xe%=knit_width%
360 m%=map%+4*(x%+1+map_width%*(yy%+1))
370 FOR xx%=x% TO xe%-1
380 IF !m%>-1 PROCadd_symbol(col_sym%(!m%),(border%+xx%)*cell_size%,(border%+yy%)*cell_size%)
390 m%+=4
400 NEXT
410 NEXT
420 NEXT
430 NEXT
440 :
450 FOR i%=0 TO knit_col_used%-1
460 y%=knit_height%+4*(knit_col_used%-i%)
470 head%()=-1
480 PROCadd_symbol(i%,border%*cell_size%,(border%+y%)*cell_size%)
490 PROCadd_grid_seg(0,y%,1,y%,0)
500 PROCadd_grid_seg(0,y%+1,1,y%+1,0)
510 PROCadd_grid_seg(0,y%,0,y%+1,0)
520 PROCadd_grid_seg(1,y%,1,y%+1,0)
530 PROCadd_text((border%+4)*cell_size%,(border%+y%)*cell_size%,col$(i%))
540 NEXT
550 :
560 FOR y%=0 TO knit_height%
570 was%=-2
580 x%=0
590 wasx%=0
600 m%=map%+4+4*map_width%*(y%+1)
610 WHILE x%<=knit_width%
620 cur%=!m%<0 AND m%!(-4*map_width%)<0
630 IF cur%<>was% OR x%=knit_width% THEN
640 IF x%>wasx% THEN
650 IF was% THEN col%=&C0C0C000 ELSE col%=&00000000
660 PROCadd_grid_seg(wasx%,y%,x%,y%,col%)
670 ENDIF
680 was%=cur%
690 wasx%=x%
700 ENDIF
710 x%+=1
720 m%+=4
730 ENDWHILE
740 NEXT
750 :
760 FOR x%=0 TO knit_width%
770 was%=-2
780 y%=0
790 wasy%=0
800 m%=map%+4*(1+x%)+4*map_width%
810 WHILE y%<=knit_height%
820 cur%=!m%<0 AND m%!-4<0
830 IF cur%<>was% OR y%=knit_height% THEN
840 IF y%>wasy% THEN
850 IF was% THEN col%=&C0C0C000 ELSE col%=&00000000
860 PROCadd_grid_seg(x%,wasy%,x%,y%,col%)
870 ENDIF
880 was%=cur%
890 wasy%=y%
900 ENDIF
910 y%+=1
920 m%+=4*map_width%
930 ENDWHILE
940 NEXT
950 :
960 row1%=0
970 WHILE row1%<knit_height% AND FNareas(row1%)=0
980 row1%+=1
990 ENDWHILE
1000 :
1010 FOR y%=row1%+9 TO knit_height% STEP 10
1020 PROCadd_grid_seg(knit_width%,y%,knit_width%+4,y%,&C0C0C000)
1030 PROCadd_grid_seg(knit_width%,y%+1,knit_width%+4,y%+1,&C0C0C000)
1040 PROCadd_text((border%+knit_width%+4)*cell_size%,(border%+y%+1)*cell_size%,STR$(y%-row1%+1))
1050 NEXT
1060 :
1070 $draw_file%="Draw"
1080 draw_file%!4=201
1090 draw_file%!8=0
1100 $(draw_file%+12)="Knit"
1110 draw_file%!24=0
1120 draw_file%!28=0
1130 draw_file%!32=(2*border%+knit_width%)*cell_size%
1140 draw_file%!36=(2*border%+knit_height%+4*knit_col_used%)*cell_size%
1150 ENDPROC
1160 :
1170 DEF PROCadd_grid_seg(x0%,y0%,x1%,y1%,col%)
1180 LOCAL wasp%
1190 IF p%+68>=draw_end% ERROR 17,"Out of memory"
1200 x0%=(x0%+border%)*cell_size%
1210 y0%=(y0%+border%)*cell_size%
1220 x1%=(x1%+border%)*cell_size%
1230 y1%=(y1%+border%)*cell_size%
1240 wasp%=p%
1250 !p%=2
1260 p%+=24
1270 !p%=-1
1280 p%!4=col%
1290 p%!8=0
1300 p%!12=0
1310 p%+=16
1320 !p%=2
1330 p%!4=x0%
1340 p%!8=y0%
1350 p%+=12
1360 !p%=8
1370 p%!4=x1%
1380 p%!8=y1%
1390 p%+=12
1400 !p%=0
1410 p%+=4
1420 wasp%!4=p%-wasp%
1430 SYS "Draw_ProcessPath",wasp%+40,,,,wasp%!32,wasp%!36,,(1<<31) OR (wasp%+8)
1440 ENDPROC
1450 :
1460 DEF PROCadd_symbol(sym%,xpos%,ypos%)
1470 LOCAL i%,similar%,r%,s%,end%
1480 xpos%+=xpos%(sym%)
1490 ypos%+=ypos%(sym%)
1500 r%=symbol%(sym%)
1510 end%=r%+symbol_len%(sym%)
1520 WHILE r%<end%
1530 obj_type%=!r%
1540 IF obj_type%=2 THEN
1550 similar%=TRUE
1560 FOR i%=0 TO 3
1570 IF head%(i%)<>r%!(24+4*i%) similar%=FALSE
1580 head%(i%)=r%!(24+4*i%)
1590 NEXT
1600 s%=r%+r%!4
1610 IF p%+r%!4>=draw_end% ERROR 17,"Out of memory"
1620 IF similar% THEN
1630 p%-=4
1640 obj%!4+=r%!4-44
1650 ELSE
1660 obj%=p%
1670 FOR i%=0 TO 39 STEP 4
1680 p%!i%=r%!i%
1690 NEXT
1700 p%!32=p%!32*scale
1710 p%+=40
1720 ENDIF
1730 r%+=40
1740 WHILE r%<s%
1750 CASE ?r% OF
1760 WHEN 0,5:!p%=!r%:r%+=4:p%+=4
1770 WHEN 2,8:PROCco_pair(r%,1,xpos%,ypos%,scale)
1780 WHEN 6:PROCco_pair(r%,3,xpos%,ypos%,scale)
1790 ENDCASE
1800 ENDWHILE
1810 SYS "Draw_ProcessPath",obj%+40,,,,obj%!32,obj%!36,,(1<<31) OR (obj%+8)
1820 ELSE
1830 FOR i%=0 TO (r%!4)-1 STEP 4
1840 p%!i%=r%!i%
1850 NEXT
1860 p%+=r%!4
1870 r%+=r%!4
1880 ENDIF
1890 ENDWHILE
1900 ENDPROC
1910 :
1920 DEF PROCco_pair(RETURN a%,prs%,xpos%,ypos%,scale)
1930 LOCAL pair%
1940 !p%=!a%
1950 FOR pair%=1 TO prs%
1960 p%!(8*pair%-4)=scale*a%!(8*pair%-4)+xpos%
1970 p%!(8*pair%)=scale*a%!(8*pair%)+ypos%
1980 NEXT
1990 a%+=8*prs%+4
2000 p%+=8*prs%+4
2010 ENDPROC
2020 :
2030 DEF PROCinit
2040 MODE 0
2050 block_size%=4
2060 border%=15
2070 cell_size%=2400
2080 scale=cell_size%/((180*256)/2.54)
2090 max_cols%=8
2100 DIM symbol%(max_cols%-1),symbol_len%(max_cols%-1)
2110 DIM xpos%(max_cols%-1),ypos%(max_cols%-1),col%(max_cols%)
2120 DIM col$(max_cols%-1)
2130 DIM head%(3),col_used%(255),col_count%(255),col_sym%(255)
2140 draw_size%=160*1024
2150 DIM buffer% &100,draw_file% draw_size%
2160 draw_end%=draw_file%+draw_size%
2170 PROCload_symbols
2180 ENDPROC
2190 :
2200 DEF PROCinit_font
2210 font$="Trinity.Bold"
2220 fsize%=8
2230 font_size%=fsize%*1000
2240 SYS "Font_FindFont",,font$,fsize%*16,fsize%*16 TO font_hand%
2250 SYS "Font_SetFont",font_hand%
2260 ENDPROC
2270 :
2280 DEF PROCtidy_up
2290 SYS "Font_LoseFont",font_hand%
2300 ENDPROC
2310 :
2320 DEF PROCadd_font_list
2330 wasp%=p%
2340 p%+=8
2350 ?p%=1
2360 p%+=1
2370 $p%=font$+CHR$0
2380 p%+=LEN(font$)+1
2390 WHILE p% MOD 4<>0
2400 ?p%=0
2410 p%+=1
2420 ENDWHILE
2430 !wasp%=0
2440 wasp%!4=p%-wasp%
2450 ENDPROC
2460 :
2470 DEF PROCload_symbols
2480 LOCAL i%,in%,a%,e%,x0%,y0%,x1%,y1%
2490 FOR i%=0 TO 7
2500 in%=OPENIN("<Knit$Dir>.Symbols."+STR$i%)
2510 symbol_len%(i%)=EXT#in%-40
2520 PTR#in%=40
2530 DIM a% symbol_len%(i%)
2540 symbol%(i%)=a%
2550 WHILE NOT EOF#in%
2560 ?a%=BGET#in%
```

```
2570 a%+=1
2580 ENDWHILE
2590 CLOSE#in%
2600 NEXT
2610 FOR i%=0 TO max_cols%-1
2620 a%=symbol%(i%)
2630 e%=a%+symbol_len%(i%)
2640 IF a%<e% THEN
2650 x0%=scale*a%!8
2660 y0%=scale*a%!12
2670 x1%=scale*a%!16
2680 y1%=scale*a%!20
2690 xpos%(i%)=(cell_size%-(x1%-x0%))/2
-x0%
2700 ypos%(i%)=(cell_size%-(y1%-y0%))/2
-y0%
2710 ENDIF
2720 NEXT
2730 ENDPROC
2740 :
2750 DEF PROCins(s$)
2760 LOCAL i%
2770 FOR i%=1 TO LEN(s$)
2780 SYS "OS_Byte",138,0,ASCMID$(s$,i%)
2790 NEXT
2800 ENDPROC
2810 :
2820 DEF PROCexamine
2830 LOCAL i%,x%,y%,m%,c%,msk%
2840 PRINT'"Examining sprite..."
2850 col_used%()=0
2860 col_count%()=0
2870 FOR y%=0 TO knit_height%-1
2880 m%=map%+4+4*map_width%*(y%+1)
2890 FOR x%=0 TO knit_width%-1
2900 IF knit_mask% THEN SYS &2E,&22B,sp
r%,knit_spr%,x%,y% TO ,,,,,msk% ELSE msk
%=1
2910 IF msk%=1 THEN
2920 SYS &2E,&229,spr%,knit_spr%,x%,y%
TO ,,,,,c%,t%
2930 IF knit_colours%=256 THEN c%=c%*4+
(t% DIV 64)
2940 !m%=c%
2950 col_used%(c%)=1
2960 col_count%(c%)+=1
2970 ELSE
2980 !m%=-1
2990 ENDIF
3000 m%+=4
3010 NEXT
3020 NEXT
3030 knit_col_used%=SUM col_used%()
3040 IF knit_col_used%>max_cols% ERROR
17,"Too many colours"
3050 FOR c%=0 TO knit_col_used%-1
3060 most%=0
3070 most_count%=col_count%(0)
3080 FOR i%=1 TO 255
3090 IF col_count%(i%)>most_count% THEN
3100 most_count%=col_count%(i%)
3110 most%=i%
3120 ENDIF
3130 NEXT
3140 col%(c%)=most%
3150 col_count%(most%)=0
3160 NEXT
3170 col_sym%()=0
3180 FOR i%=0 TO knit_col_used%-1
3190 col_sym%(col%(i%))=i%
3200 NEXT
3210 ENDPROC
3220 :
3230 DEF PROCinit_map
3240 LOCAL i%
3250 map_width%=knit_width%+2
3260 map_height%=knit_height%+2
3270 map_size%=map_width%*map_height%*4
3280 DIM map% map_size%
3290 FOR i%=0 TO map_size%-1 STEP 4
3300 map%!i%=-1
3310 NEXT
3320 ENDPROC
3330 :
3340 DEF PROCget_sprite
3350 OSCLI("CAT <KnitSprite$Dir>")
3360 PRINT''
3370 REPEAT
3380 INPUT "Which sprite file? "file$
3390 sprite_file$="<KnitSprite$Dir>."+f
ile$
3400 SYS "XOS_File",5,sprite_file$ TO e
xists%,,,,len%
3410 UNTIL exists%=1
3420 DIM spr% len%+4
3430 !spr%=len%+4
3440 SYS "OS_File",255,sprite_file$,spr
%+4
3450 SYS "OS_SpriteOp",&10D,spr%,buffer
%,&100,1 TO ,,,name_len%
3460 buffer%?name_len%=13
3470 knit_sprite$=$buffer%
3480 SYS "OS_SpriteOp",&118,spr%,knit_s
prite$ TO ,,knit_spr%
3490 SYS "OS_SpriteOp",&228,spr%,knit_s
pr% TO ,,,knit_width%,knit_height%,knit_
mask%,knit_mode%
3500 SYS "OS_ReadModeVariable",knit_mod
e%,3 TO ,,knit_colours%
3510 knit_colours%+=1
3520 IF knit_colours%=64 knit_colours%=
256
3530 ENDPROC
3540 :
3550 DEF PROCinput_cols
3560 LOCAL i%,a%
3570 CASE knit_colours% OF
3580 WHEN 2:MODE 4
3590 WHEN 4:MODE 1
3600 WHEN 16:MODE 9
3610 WHEN 256:MODE 13
3620 ENDCASE
3630 IF knit_colours%<256 AND knit_spr%
!32>48 THEN
3640 FOR i%=0 TO knit_colours%-1
3650 a%=knit_spr%+48+8*i%
3660 COLOUR i%,a%?1,a%?2,a%?3
3670 NEXT
3680 ENDIF
3690 PRINT'"Sprite '"knit_sprite$"':"'
3700 PRINT"height=";knit_height%;", wid
th=";knit_width%
3710 PRINT"mode=";knit_mode%;", colours
=";knit_colours%''
3720 FOR i%=0 TO knit_col_used%-1
3730 IF knit_colours%=256 THEN GCOL (co
l%(i%) DIV 4) TINT (col%(i%) AND 3)<<6 E
LSE GCOL col%(i%)
3740 RECTANGLE FILL 0,988-32*VPOS,32,32
3750 GCOL 63 TINT 192
3760 RECTANGLE 0,988-32*VPOS,32,32
3770 PRINTTAB(2,VPOS);"Name: ";
3780 PROCins(CHR$(i%+65))
3790 INPUT""col$(i%)
3800 NEXT
3810 ENDPROC
3820 :
3830 DEF PROCadd_text(left%,topy%,c$)
3840 LOCAL x0%,y0%,x1%,y1%,h%
3850 $buffer%=c$+CHR$0
3860 SYS "Font_SetFont",font_hand%
3870 SYS "Font_StringBBox",,buffer% TO
,x0%,y0%,x1%,y1%
3880 x0%=x0%*0.64
3890 y0%=y0%*0.64
3900 x1%=x1%*0.64
3910 y1%=y1%*0.64
3920 wasp%=p%
3930 p%+=24
3940 !p%=0
3950 p%!4=&FFFFFF00
3960 p%!8=1
3970 p%!12=font_size%
3980 p%!16=font_size%
3990 p%!20=left%
4000 p%!24=topy%-y1%
4010 p%+=28
4020 $p%=c$+CHR$0
4030 p%+=LEN(c$)+1
4040 WHILE p% MOD 4<>0
4050 ?p%=0
4060 p%+=1
4070 ENDWHILE
4080 !wasp%=1
4090 wasp%!4=p%-wasp%
4100 wasp%!8=left%+x0%
4110 wasp%!12=topy%-(y1%-y0%)
4120 wasp%!16=left%+x1%
4130 wasp%!20=topy%
4140 ENDPROC
4150 :
4160 DEF FNareas(y%)
4170 LOCAL m%,was%,areas%,x%,count%
4180 m%=map%+4*(1+map_width%*(y%+1))
4190 was%=-2
4200 areas%=0
4210 FOR x%=0 TO knit_width%-1
4220 state%=!m%>-1
4230 IF state%<>was% THEN
4240 count%=1
4250 was%=state%
4260 IF state% THEN areas%+=1
4270 ELSE
4280 count%+=1
4290 ENDIF
4300 m%+=4
4310 NEXT
4320 =areas%
4330 :
4340 DEF PROCmake_text
4350 LOCAL out%,y%,s$,t$,dir%,x0%,x1%
4360 PRINT"Making textfile..."
4370 out%=OPENOUT("<KnitText$Dir>."+fil
e$)
4380 y%=row1%
4390 s$=""
4400 dir%=-1
4410 WHILE y%<knit_height%
4420 PROCbput("Row "+STR$(y%+1-row1%)+"
: ")
4430 CASE FNareas(y%) OF
4440 WHEN 0:PROCbput("-")
4450 WHEN 1:
4460 IF dir%<0 x0%=knit_width%:x1%=0 EL
SE x0%=1:x1%=knit_width%+1
4470 was%=-2
4480 FOR x%=x0% TO x1% STEP dir%
4490 m%=map%+4*(x%+map_width%*(y%+1))
4500 IF !m%<>was% OR x%=x1% THEN
4510 IF was%>-1 PROCbput("  "+STR$count
%+" "+col$(col_sym%(was%)))
4520 was%=!m%
4530 count%=1
4540 ELSE
4550 count%+=1
4560 ENDIF
4570 NEXT
4580 dir%=-dir%
4590 OTHERWISE
4600 PROCbput("consult pattern")
4610 ENDCASE
4620 y%+=1
4630 PROCwrites
4640 ENDWHILE
4650 CLOSE#out%
4660 SYS "OS_File",18,"<KnitText$Dir>."
+file$,&FFF
4670 ENDPROC
4680 :
4690 DEF PROCbput(t$)
4700 IF LEN(s$+t$)>72 PROCwrites:s$=t$
ELSE s$+=t$
4710 ENDPROC
4720 :
4730 DEF PROCwrites
4740 IF s$<>"" BPUT#out%,s$:s$=""
4750 ENDPROC
```

ASSEMBLY LINE

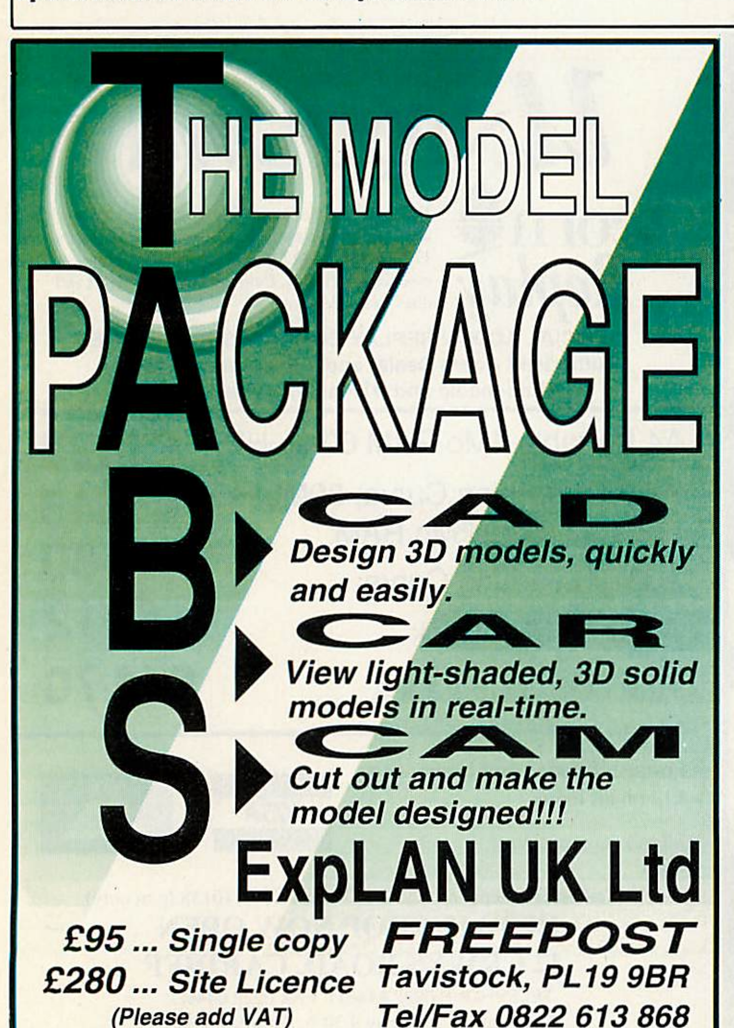
Listing 1

```
 10 REM >ARM1 (Arm1)
 20 REM By Dave Lawrence
 30 REM For 32 bit machines
 40 REM (C) BAU January 1993
 50 :
 60 DIM code 256
 70 sp=13
 80 link=14
 90 pc=15
100 FOR pass=0 TO 2 STEP 2
110 P%=code
120 [OPT pass
130 .hello
140         STMFD   (sp)!,{link}
150
160         SWI     "OS_WriteS"
170         EQUS    "Hello World!"
180         EQUB    0
190         ALIGN
200
210         LDMFD   (sp)!,{pc}
220 ]NEXT
230 CALL hello
```

Listing 2

```
 10 REM >ARM2 (Arm2)
 20 REM By Dave Lawrence
 30 REM For 32 bit machines
 40 REM (C) BAU January 1993
 50 :
 60 DIM code 256
 70 sp=13
 80 link=14
 90 pc=15
100 FOR pass=0 TO 2 STEP 2
110 P%=code
120 [OPT pass
130 .hello_world
140         STMFD   (sp)!,{link}
150
160         BL      hello
170         BL      world
180
190         LDMFD   (sp)!,{pc}
200
210 .hello
220         SWI     "OS_WriteS"
230         EQUS    "Hello "
240         EQUB    0
250         ALIGN
260
270         MOV     pc,link
280
290 .world
300         SWI     "OS_WriteS"
310         EQUS    "World!"
320         EQUB    0
330         ALIGN
340
350         MOV     pc,link
360 ]NEXT
370 PRINT"Two calls: ";:CALL hello:CAL
L world
380 PRINT'"One call : ";:CALL hello_wo
rld:PRINT
```

NOTES



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● Archimedes A420/1 Learning Curve with Arm3, Impression 2 plus others, 40Mb hard disc, 4Mb Ram, multisync monitor – £1000 ono. Contact Mr R Flounders, Belford. Tel: (0668) 213617

● Master 128, 40/80 and 3.5in drives, Taxan NLQ printer, reference manuals, joysticks, some software and Roms – £295. Contact Mr A Mepham, Surrey. Tel: (0483) 772681

● A3000, 2Mb Ram, hard disc and controller, user/Midi port, original manuals, application discs – £600 ono. Contact Mr J Hancox, Northants. Tel: (0604) 863876

● A420/1 with 50Mb hard disc, Acorn colour monitor, Learning Curve software, DTP, Genesis, Dr Dos, PC Emulator, Impression Junior, ten months old – £950. Contact Mr C Venier, Portsmouth. Tel: (0705) 872089

● Master 128, Microvitec RGB monitor, dual 40/80 track disc drive unit (ADD03), plus manuals and lots of various software – a bargain for only £300. Contact Mr A Hopkins, Gosport. Tel: (0705) 526800

● A3000 2Mb upgrade made redundant by upgrading to 4Mb – first offer of £15 secures. Contact Mr T Warner, Wrexham. Tel: (0978) 751673

● BBC B, Philips green monitor, 40/80 track disc drive, sideways Rom, PCN, Roms, games, word processing software, manuals – £250 ono. Contact Mr S Powley, Cambridge. Tel: (0223) 212910

● Wanted: Archmedes A3000 computer, will consider A310/A410 series, any condition considered, also red colour monitors, any type – cash waiting. Contact Mr A Allen, Derby. Tel: (0332) 664962

● A3000 complete with full Learning Curve package, Acorn colour monitor, disc interface, 15 months old, little used – £575. Contact Mr E Paxton, Walsall. Tel: (0543) 672910

● Archimedes 420/1, Acorn colour monitor, 20Mb hard disc, 4Mb Ram, includes applications PD, demo, software, manuals, boxed, mint condition – £850 ono. Contact Mr P Mendham, Somerset. Tel: (0278) 427875

● A3000 1Mb and Acorn RGB monitor, serial upgrade, Pres stand, DTP, games, manuals, discs, excellent condition – £500. Contact Mr S Morton, Staffs. Tel: (0785) 760626

● Master 512, amber monitor, 40/80, 525/3.5in combine disc unit, Pos plus 2.1, Gem and other Dos software, manuals, Epson LQ80 sheet feeder – £650 the lot. Contact Mr G Lewis, Manchester. Tel: 061-799 5237

● Dabhand guides: Archimedes assembly language and Archimedes operating system, both for – £15. Contact Mr K Druce, Dorset. Tel: (0258) 452977

● 4Mb A310, Microvitec colour monitor, 20Mb hard drive, good selection of software – £600 ono. Contact M Webb, Northants. Tel: (0604) 832149

● Master compact, 3.5in ADFS, mono monitor, TV modulator, Seikosha GP100A printer, all cables, Dumpout Roms, manuals and discs – £225 ono, quick sale. Contact I Nicholson, Chelmsford. Tel: 071-839 6283 office hours, (0245) 321709 after 8pm.

● Electron, Plus 1, Plus 3, Turbo board, second processor, View Rom, Seikosha GP100A printer, games, books, set Electron User – £250 ono, will split, list available. Contact Mr J Hoban, Carlisle. Tel: (0228) 401918

● Wanted: Archimedes computer for school child, will pay good price and collect. Contact M Rai, Derby. Tel: (0332) 281540

● BBC B, 32K, DFS, dual switchable disc drives, 12in green screen monitor and stand, AMX mouse, V23 modem, tape recorder, Rom, disc and tape software. Contact Mr C Thorpe, Suffolk. Tel: (0449) 722334

● Master Compact, green Acorn monitor, 3.5in disc, ADFS, Play It Again Sam 10, 11, 14, Last Ninja 2, Blitz and Welcome disc – £200 ono. Contact L Curley, Walsgrave. Tel: (0203) 619640

● Integrex colourjet 132 printer, excellent condition – £300 ono, 1st Word Plus (new) – £25, Acorn DTP (new) – £30, Genesis Plus (new) – £30. Contact Mr Freeman, Derbyshire. Tel: (0773) 835168

● Electron expanded with tape deck, disc drive, additional Roms, 60 plus games also spare Electron £600+ – £250 ono. Contact S Shellard, Leicester. Tel: (0533) 848762

● Archimedes 440/4, Arm 3, 50Mb hard drive, multisync monitor, software, books – £995, new half height 5.25in drive – offers around £60. Contact M Humphries, Soton. Tel: (0489) 579748

● A3000 2Mb, serial interface, Vide enhancer and new multisync colour monitor (worth over £300 alone) excellent condition – £675. Contact Mr D Fry, Cheltenham. Tel: (0242) 234342

● Master 128, 40/80 disc drive, colour monitor, Quest Paint, other software and games – £300. Contact Mr D Reed, Somerset. Tel: (0278) 421420 eve only

● Master 128, green monitor and manuals – £220, 512 board with Gem, mouse and manuals – £75, also software including Wapping Editor, Publisher, Printwise etc – offers. Contact Mr W Hough, Manchester. Tel: 061-301 4974

● A3000 4Mb, colour monitor, 9 pin printer, serial upgrade, leads, manuals, boxes, magazines, discs – £850 ono. Contact Mr E Cook, Essex. Tel: (0245) 467787.

● BBC B Issue 7 with View word processor, disc filing system, colour monitor and all manuals, good condition, hardly used – £150. Contact Mr R Clifford, Cambridge. Tel: (0223) 842551

● A3000 Learning Curve, original manuals and discs – £680. Contact Mr P Stead, Cambridge. Tel: (0223) 246748

● Archimedes 310, 4Mb, colour monitor, MEMC1a upgrade, lots of software (serious and games) – £550 ono. Contact Mr J Baker, Exeter. Tel: (0392) 422815

● Archimedes A310 4Mb Ram colour monitor, virtually unused, games worth £130, 20 Acorn User magazines and discs – £450. Contact A Frankish, Doncaster. Tel: (0302) 884890

● Master 128, green mono monitor, 40/80 5.25in disc drive, very good condition – £250, 512k PC board etc – £99. Contact Ms A Newman-Brown, Bedford. Tel: (0234) 856070

● 1Mb upgrade (expandable) for A3000 – £35, Lemmings – £12, E Type – £10. Contact Mr J Chatwin, Coventry. Tel: (0203) 544109

● A3000 2Mb base unit, Learning Curve software, three months old – £425, A3000 2Mb Ram upgrade, boxed – £35, BBC Master 128k, 3.5/5.25 in disc drives in stand – £225. Contact C Terrell, Essex. Tel: (0708) 471426

● For sale: Squirrel (includes V1.2 upgrade), 1st Word Plus version 2, miscellaneous games. Contact Mr C Taylor, Reading. Tel: (0754) 597800

● A3000, Arm 3 processor, 4Mb Ram, 40Mb hard disc, colour monitor and stand, PC Emulator 1.8, Learning Curve software, no splits – offers around £1000. Contact Mr K Rutter, Stafford. Tel: (0785) 44023

● Acorn JP150 printer, boxed as new, excellent condition, seven months old, including lead – £200 ono. Contact Mr S Hare, Liverpool. Tel: 051-427 5892

● A500, 40Mb hard drive, 2Mb Ram, Learning Curve, brand new and fully boxed – £1200. Contact A Khan, London SE22. Tel: 081-693 8164

● Scsi interface for A3000, new, boxed, unused, manual – £35 including post. Contact Mr R Laing, Essex. Tel: (0206) 575581 eve

● For A3000 series: E-Type Compendium – £13, 1st Word V2 – £40, Maths II – £11, Vim – £15, Genesis – £60, Cops – £10, all complete with manuals. Contact Mr A Wilson, Glastonbury. Tel: (0749) 890479

● 20Mb Miniscribe hard drive, very good condition, lots of Archimedes PD software, ideal for 400 series – £60. Contact Mr B Cocksedge, West Sussex. Tel: (0730) 812341 ext 5059 eve, ext 2170 day

● 1st Word Plus V2, Shrink wrapped, untouched – offers please. Contact Ms E Hailstone, Stockbridge. Tel: (0264) 781704 eve

● Master 128k, Watford twin 40/80 double disc drive, Acorn data recorder, Voltmace joystick, mouse, printer stand, manuals, leads, games on disc and cassette – £300. Contact E Randall, Balcombe. Tel: (0444) 811615

● BBC B, modem, joystick, large number keyboard, Roms (Viewsuite etc), lots of software on disc, magazines, many extras – only £200 ono (printer extra). Contact Mr B Sharp, Cambridge. Tel: (02205) 2769.

● Master 128, View, Viewspell, Viewsheet, ADFS, Basic, Editor, 5.25in 80 track disc drive, Citizen 12OD printer, manuals – £275 ono. Contact A Farooq, Doncaster. Tel: (0302) 342256

● Master Turbo, Microvitec 1451 monitor, dual 40/80 DS drives, Rom cartridge system, joystick, mouse, Roms, programs and manuals – £400. Contact Mr M Robertson, Aylesbury. Tel: (0296) 23124

● Dual 40/80 track drives power supply unit, BBC software, manuals, magazines, all for only – £120 ono. Contact Mr V Dhanuka, Essex. Tel: 081-551 3030

● BBC B Issue 7, 40/80 disc drive, Teletext adaptor, View, lots of software, over 60 discs and case, all relevant manuals – £230. Contact Mr D Bradshaw, Warwick. Tel: (0926) 401223

● Archimedes games for sale: Mig 29 Fulcrum – £15, Enter the Realm – £12, Break 147 and Superpool – £15, Man Utd Europe – £12. Contact Mr K Rogers, Notts. Tel: (0602) 201397

● Computer Concepts Compression, uninstalled – £28 or swap for Equasor, also Watford external disc drive interface for A310 – £10. Contact Mr L Smith, Alfreton. Tel: (0773) 873611

● Wanted: Rhapsody or Rhapsody II, must be original disc with manual. Contact R Williams, Bucks. Tel: (0628) 474394

● Master 128k, 40/80 disc drive, mouse, Spellmaster, manuals etc – £260, Taxan/Kaga KP-810 printer – £75. Contact D Hallam, Potters Bar. Tel: (0707) 56761

● 2 BBC Bs both with disc drives and hardware including Econet, View and Interword also software, both very good condition, as new – £250 each ono. Contact D Gartiside, Solihull. Tel: (0564) 770254

● *Archimedes* games software: Saloon Cars – £10, Chocks Away Compendium (1&2, Extra Missions) – £15. Contact Mr N Westley, Solihull. Tel: (0564) 776360

● Electron 32k, many games, tape recorder, all leads, good condition, cassette carrier, all books and information included – £35. Contact Mr G Emerson, Loughborough. Tel: (0509) 214166

● Risc OS programmer's reference manuals – £35. Contact Mr M Jennings, Fleet. Tel: (0252) 629338

● Master 128k, Cumana 40/80 disc drive, Quest mouse and Rom, manuals, software including Mini Office II, Repton II, many more – £350. Contact Mr R Molyneux. Tel: (0706) 876409

● Microvitec Cub colour monitor – £100, Cumana dual 40/80 5.25 floppy disc drive – £100, excellent condition. Contact Mr G Hall, Manchester. Tel: 061-320 5295

● A3000, expanded to 2Mb, serial upgrade, Learning Curve package, many games and PD software, as new – £495. Contact Khalid Rafiq, Livingston. Tel: (0506) 440238

● Archimedes 310 and Arm 3 (30Mhz), monitor, Impression II, Pipedream, Squirrel, Atelier, Pascal, Render Bender II, programmer's manuals and games, Elite etc, excellent condition – £600. Contact Mr S Elliott, Gwent. Tel: (0633) 892645

● All Archimedes users are invited to join our Archimedes Users Club. Write to: J Michalski, 6 Furzeland House, Sheephouse Way, New Malden, Surrey KT3 5PH for more details.

● A3000, 4Mb Ram, 80Mb hard drive, Arm 3, hand scanner, stackway system, lots of software, manuals – £975. Contact Mr A Young, Lancs. Tel: (0254) 771656

● Watford 32K shadow Ram card for BBC B, as new – £25. Contact Mr S Antczak, Surrey. Tel: (0883) 716286

● Wanted for BBC B: Watford 32k shadow Ram or Aries B-32 shadow Ram also Spellmaster Rom. Contact Mrs J Allen, Bracknell. Tel: (0344) 422614

● A310 with 4Mb Ram, Arm 3, four slot backplane, Citizen rod printer, Risc OS 2, PRM and software inlcuding Lemmings, Elite, PC Emulator, all boxed – £800. Contact Mr R Everett, Gwent. Tel: (0222) 866710

● A3000, 2Mb Arm 3, Risc OS 3, Vied upgrade, colour monitor, 45Mb hard drive, excellent condition plus software – £1100 (compare with A5000 – £1500 +VAT). Contact Mr T Dagger, Blackpool. Tel: (0253) 691074 eve (0772) 265421 day

● Master 128, twin Cumana drive, Microvitec monitor, Epson printer, many games and discs, worth over £900, boxed – £600. Contact T Bridges, Dorset. Tel: (0747) 52825 eve

● BBC B, 6502 second processor, book drives, colour monitor, joysticks, manuals, much software, including ISO-Pascal, Database, View, Viewsheet, music system, many games – £250 ono. Contact Mr P Drake, Northants. Tel: (0933) 664619

● A3000, 45Mb external Scsi drive, 2Mb Ram, Phillips stereo monitor and stand – will haggle. Contact Mr J Davighi, Northampton. Tel: (0604) 642413

● Master 128, internal modem, disc drive, excellent condition – offers, Hybrid music 5000-2000 units, immaculate – offers. Contact E Davis, Carly Hill. Tel: 091-516 0513 answering machine

● A3000 2Mb, Philips CM 8833 colour monitor, all boxed as new – £625, Star LC10 colour printer – £80. Contact Mr J Evans, Birmingham. Tel: 021-445 5431

● BBC Watford Digitiser, as new – £80 ono, Acorn second processor – offers, BBC twin discs in case – offers. Contact Mr P Minto, Gwynedd. Tel: (0492) 59464

● Master, VDU and double disc drives 3.5in/5.25in, Eprom programmer and mouse, FX1000, printer and cartridge, very good condition – £550. Contact D Gartside, Solihull. Tel: (0564) 770254

● Master 512, 2 5.25 in disc, colour VDU, 6502 co-processor, lots of games, lots of Roms, all manuals – £400. Contact Mr A Brion, Sunbury. Tel: 081-890 2662

● Blowpipe – £17, MIG-29 –£31, Real McCoy – £25, four games will sell seperate – £12 each. Contact Mr P Hill, Sussex. Tel: (0798) 6589

● Games fanatics: Want to know all about latest Archimedes games? Write to T Hassan, 163 Hook Road, Surbiton, Surrey KT6 5AR for a preview copy.

● A3000 2Mb and colour monitor (Microvitec) – £450 buyer collects, manuals wanted for A310, money available. Contact Mr R Collins, Castleford. Tel: (0977) 555709

● Wanted: Acorn Electron cassettes. Contact Mr J Wall, Dyfed. Tel: (0974) 272613

● Master 128, colour monitor, disc drive, Epson printer, Prestel adaptor, books and software (lots includes View, Spreadsheet and games). Contact Mr M Cottrill, Cheshire. Tel: (092575) 4097

● Master 128k Cub monitor, 5.25in and 3.5in double drive, 65C102 co-processor, IBM emulator, AMX Art, mouse, Morley Teletext adaptor, software, manuals – £500. Contact Mr T Gill, Surrey. Tel: (0883) 652306

● 20Mb miniscribe (MFM) harddrive, good condition, ideal A400 series – £60. Contact Mr B Cocksedge, West Sussex. Tel: (730) 812341 ext 2170 day, ext 5059 eve

● Illusionist – £65, Gods – £20, Swiv – £17, Lemmings – £15, Cataclysm – £15. Contact Mr E West, Loughton. Tel: 081-508 7648

● BBC B 32k, Acorn DFS and single disc drive, tape deck, joystick, Mini Office II word processor, loads of software and magazines etc – around £220. Contact Mr P Whitehouse, Sheffield. Tel: (0742) 554301

● Pace Linnet 24 V22 bis V22 V23 V21 – £130 ono, unwanted unopened prize. Contact Mr R Gates, Norfolk. Tel: (0603) 872071

● Wanted: Acorn Atom, must be complete, working and with software. Contact R Bhattacharya, Herts. Tel: (0582) 769152 eve/weekends

● Laser Direct printer for Archimedes c/w with interface and cables, very little use – £795 ono. Contact R Weston, Dorset. Tel: (0202) 740147

● Master 128, medium resolution colour monitor, 40/80 track double drive, LX800 printer, computer trolley bench – complete work station – £500. Contact G Jenkins, Kent. Tel: 081-464 8276

● Pres box with power supply, two 3.5in drives and A3000 buffer, Citizen 24 printer with colour kit and Atelier – each half price. Contact W Neilson, Edinburgh. Tel: 031-664 0595

● Master compact, monitor, 3.5in drive, printer, mouse, 50+ games, joystick, stylish desk, books – £400 ono. Contact Mr J Farr, Northolt. Tel: 081-842 0180

● BBC B, Opus Challenger 3 40/80 track double disc drive, 256k Ram disc, Computer Concepts graphics Rom, software (games/utilities) – £265 ono, manuals and leads included. Contact Mr S Sweet, Bath. Tel: (0225) 317513

● Archimedes 310 for sale, includes a colour monitor and double disc drive (but no hard disc). Contact Mr G Merchant, London WC1. Tel: 071-580 2211

● Archimedes 440/1 colour system, 4Mb Ram, 53 Mb hard disc, Scsi podule and Econet fitted, lots of software, spare mouse, boxed, very good condition – £1000 ono. Contact R Melloy, Herts. Tel: (0707) 371819

● Solidisk 2Mb memory expansion with manager Rom and space for three more Roms – offers? Contact Mr R Rayner, Suffolk. Tel: (0284) 757229

● A3000, 2Mb Learning Curve, colour monitor, eight full price games, joystick interface, joystick and more – £700 ono. Contact Mr D Kirkham, Monkseaton. Tel: 091-2531883

● 6SC102 co-processor and user guide for BBC Master series – £75 ono. Contact Mr I Robinson, Margate. Tel: (0843) 298465

● Elite (gold edition), Tactic, Leaderboard, Midnight Tracer, Clips 2, Tracker, Z88 and accessories. Contact Mr B Pargetter, Herts. Tel: (0462) 434061

● Pres disc expansion card including DFS Rom, for Archimedes A3000 and 40/80 track disc drive with power supply – £75, 1st Word Plus – £20. Contact F Brewer, Clwyd. Tel; (0745) 583930

● A3000, 2Mb Ram with Philips CM8833 colour monitor – £600 ono, also BBC B. Contact Mr G Suttie, Carlisle. Tel: (0228) 711636

● A3000 and RGB colour monitor, 2Mb Ram, over 50 discs of software – £590. Contact Mr C Arnold, Rotherham. Tel: (0709) 548698

● Master 128, single 40/80 track disc drive, Acorn colour monitor, lots of games, BBC Acorn User back issues – £400. Contact Mr T Lawrence, London NW10. Tel: 081-969 6920

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ALTERED IMAGES

Rob Miller explores the possibilities offered by Palette's Imagery

Art packages on the Archimedes are available in abundance, so a new program has got to be a) better or as good as those already available, or b) something different. *Imagery*, from newly formed company Palette Studio, is billed as 'the ideal upgrade to *Paint*', and has been designed to be used for creating new artwork, as well as for processing 'grabbed' images.

Imagery is fully Risc OS compliant; that is, it runs on the desktop alongside other applications. It works fine with either Risc OS 2 or Risc OS 3 (this review was carried out on an A5000 with Risc OS 3.0) as none of the tools rely on the features of the latter.

Although it runs in any desktop mode, *Imagery* will only allow you to work on mode 15 pictures. In any other mode, pictures are scaled and/ or recoloured if required. It seems strange that the ability to use high-resolution, 'square-pixel' modes such as mode 21 or mode 28 has been removed, especially as a lot of digitisers and scanners make use of those modes to provide more realistic detail.

GETTING GOING

When run, *Imagery* brings up a window with a black background into which you can draw. Unlike other art packages, there is no option to clear the screen to a chosen colour, so unless you want to draw onto black, you need to flood fill the background with your chosen colour.

Most Risc OS standards are adhered to; for example, saving a picture is a case of dragging an *Imagery* file icon to a filer window. There are, however, a few instances where non-standard icons are used, for example radio icons, which can confuse you at first.

I can imagine that some people would rather have their own 'customised' icons, but I believe that it is best to stick to the standard icons supplied in Risc OS, and then let the user change them if he or she wants to. If all programs kept to this philosophy, then learning how to use Risc OS programs would be made that much simpler. The tools available in *Imagery* fall into three groups.



This background was produced with a combination of several tools. The spray can was used to place a few random stars, and then Wet-brush was used to smudge a few to give a better sense of depth. A couple of larger stars were scanned separately, imported and dropped in, and a colour tint was used to shade them to give them that authentic 'deep-space' look. The wet-brush tool was used again to add blur to the more distant stars.



Another pre-scanned image was imported for the Earth. This was originally a greyscaled image which was then tinted blue once it had been imported into *Imagery*. A bit of touching up with the airbrush was then used to produce the 'dark side' of the Earth. The comets are two copies of the same imported sprite (another greyscale scan). One was imported into *Imagery* and then a copy was made and rotated to form the second one.

DRAWING THE LINE

First, there are tools that allow you to draw something meaning lines, shapes and fills. These can all be selected from a toolkit window which can be brought up at any time.

All the usual tools are present; lines, dots, a spray can and a flood fill. The graded fill allows an area to be filled with a group of up to 16 colours. Sixteen pre-defined scales are provided with the option of designing your own if required. A separate graduated-fill window gives a list of possible fills, plus a new palette for designing purposes.

New scales can be 'hand-picked', that is, each colour in the scale can be selected from a palette. The alternative is to choose a start and end colour and let *Imagery* work out the colours in between.

The scales produced by this method vary in quality, because there are only a limited number of colours to chose from in the Archimedes 256-colour mode palette. A grey scale, for example, can contain up to 16 levels from white to black, whereas if you were to choose, say, purple and black as the start and end colour, the resulting scale would be much shorter.

Once selected (or defined), scales can be used to fill any solid area of colour. The angle at which the fill occurs can be altered in steps of one degree via arrow icons on the graduated-fill window. Other places in the program where *Imagery* makes use of arrow icons, allow the user to type in the number as well.

Circular fills are also possible and are useful for highlighted spheres and the like.

SPECIAL FX

The second group of tools consists of a selection of 'effects' that can be applied to any rectangular area of the picture. These include such features as grey scaling, pixelating and contrast control.

These 'image-processing' tools are one of the major selling points of the package. Some like Trace, Smudge and Grey Scale, can be found in other packages (such as Longman Logotron's *Revelation*). Others, however, are unique to *Imagery*, and provide some

interesting ways of manipulating part of a picture.

'New' features include the ability to alter contrast, alter the levels of red, green and blue by a fixed amount, and convert an area to a colour scale (similar to a grey scale). All of these work over a rectangular area of the picture which is defined by pointing at one corner and then dragging a rubber-banded box.

MOVING ON UP

A final list of tools allow areas to be manipulated in some manner; copying, moving and rotating. A lot of the tools can have quite a drastic effect and it comforting to have an Undo facility that allows you to back-step any action.

Pixel mapping is a feature unique to *Imagery* and allows any four-sided area to be mapped onto any other four-sided area. Both areas are selected by pointing and clicking on each corner, whilst dragging a rubber-banded box.

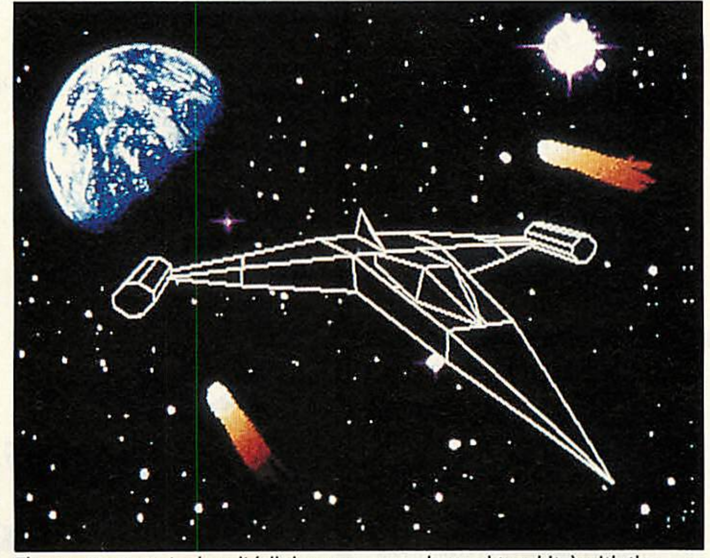
Although quite powerful, the pixel-mapping tool is extremely slow, and all but the smallest areas take quite some time to transfer across. Doing all the maths required while 'multi-tasking' in the desktop must slow things up a bit, but I'm sure the time taken could have been reduced.

Perhaps the most interesting (and definitely the hardest to get to grips with) 'movement' tool is the curiously named 'wobble'. This lets you take an area of the picture and distort it by transforming it with a mathematical equation.

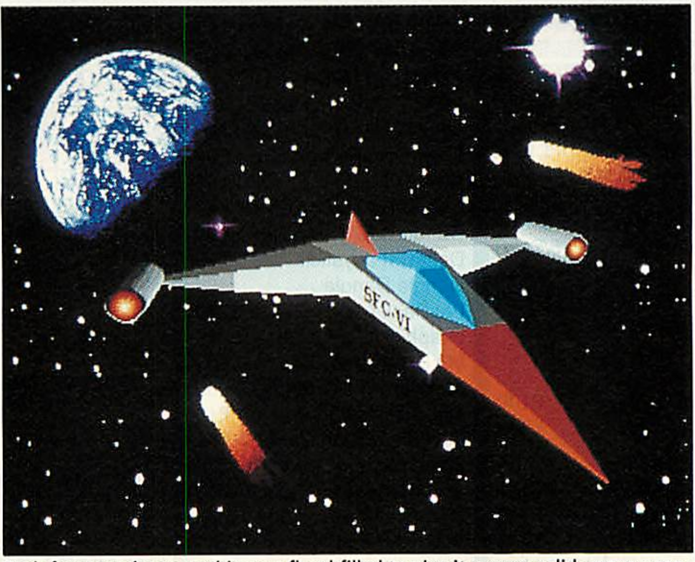
If your maths isn't up to scratch, it can be difficult to make any sense of 'wobble', although the manual attempts to simplify things by giving a few examples. A small preview window allows you to test the effect of the equation before applying it to your actual picture.

Imagery has just one 256-colour palette from which to choose shades, where colours are arranged in numeric order as one would obtain if using the GCOL command in Basic. Although not unusable, it is quite difficult to locate similar shades when they are at different ends of the palette.

As well by the use of the palette, colours can be selected by pointing at a particular place on your current picture. The colour directly underneath the pointer is then selected as the new drawing colour. Selecting colours this way is easy thanks to the implementation of 'hot keys'. This means that commonly used tools can be selected using function keys.



The comets were 'reduced' (all the greys were changed to white) with the colour replace tool, making them easier to fill. A graded fill was designed consisting of white, yellow, orange, red to give a 'hot flame' effect (although comets actually consist of ice). This was then rotated accordingly to fit the comet outlines. The main ship was created in *Draw*, grabbed using the Snapshot facility in *Paint*, and then imported into *Imagery*. All three programs were running simultaneously, making file transfer much simpler. A few stray pixels were touched up by magnifying the picture and drawing over them with the 'basic' draw tool.



Each facet on the spaceship was flood-filled to give it a more solid appearance. The white construction lines were then removed or overdrawn, with a combination of the colour replace tool and basic draw tool. The two rocket engines were actually filled by hand with the same 'comet' graded-fill being used for the centres. These also required some touching up; again done with the zoom and draw tools.

The 'SFC-VI' design on the side of the spaceship was first created as a piece of black text (in Newhall Bold) on a grey background. This rectangle was then mapped onto the ship using the pixel-map tool. The resulting lettering was a bit unclear, so a few 'anti-aliasing' grey pixels were added with the zoom and draw tools to improve readability.

WHAT'S IT WORTH?

Although *Imagery* has features that the others don't, I can't really see that these justify the extra cost. There are a number of excellent packages in the public domain, such as *AIM*, that have similar 'image-processing' features to those in *Imagery* and I would prefer to stick with those.

So; *Imagery* is not my first choice when it comes to Risc OS art packages. The restriction of only being able to produce mode 15 screens is limiting to say the least. The slow action of a number of the tools makes the program awkward for beginners and frustrating for people who have learnt the ropes and just want to get on and draw.

This is the first release of *Imagery*, so there are too many 'loose ends' and the program has a distinctly 'fragile' feel to it. Inconsistencies between the manual and the actual program don't help matters; an example being references to an 'Options' menu when it is actually called the 'Misc' menu in the actual program.

At £89.95 (inc VAT), *Imagery* doesn't really represent good value for money. If you've got around £100 to spend on an art package, you're much better off going for something like *Snippet* or *Revelation* (thus saving £50 in the process).

In addition, the public domain version of *AIM* can be obtained from a number of PD libraries (see the small ads at the back of *BAU*) for the price of a blank disc.

THE COMPETITION

Although there are many art packages on the market for Acorn 32-bit computers, most do not conform particularly to the Risc OS standard, meaning most operate outside of the desktop, with their own particular system of menus and so on. There are only two programs therefore that could be regarded as contenders, namely *Snippet* from 4Mation and the first version of *Revelation* from Logotron. Both cost about half the price of *Imagery* (*Revelation* is £46.95 inc. VAT and *Snippet* is £44.00 inc VAT)

PRODUCT DETAILS

Product: Imagery
Supplier: Palette Studio, 6c/6d Belgic Square, Peterborough, Cambs. PE1 5XF
Tel: (0733) 344245
Price: £89.95 inc VAT

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QuickSound allows you to load, play, convert & resave existing sound samples. Armadeus, Tracker, raw data formats are supported. Samples can also be converted into modules for use with the RISCOS sound system, Rhapsody etc or alternatively converted into stand alone Utility sample modules which when called, via a star command, automatically plays the sample and then removes itself completely from memory (this feature is not available on any other sound package). Special effects can be applied to samples including Reverse, Echo, Max Vol, alter replay rate and resample at other frequencies. On screen VU meter included. QuickSound is a perfect compliment to the Oak Sound Recorder.

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Archimedes, A3000, A5000 Software

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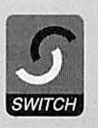
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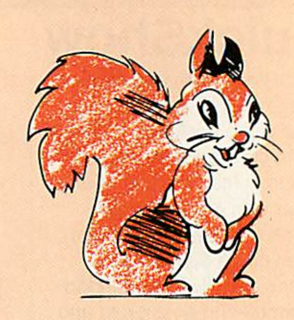






JAN 93

SQUIRREL

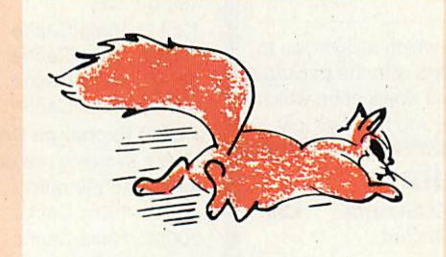


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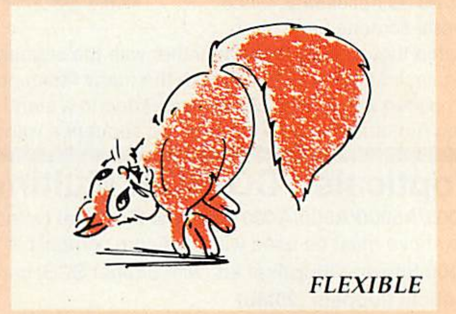
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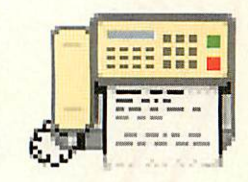
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FILES OF FAX



A fax combined with an answering machine? Ian Burley gets tallking to FaxPack

A software upgrade to endow FaxPack for the Archimedes with a file transfer facility has been promised by Computer Concepts for rather longer than they might like to recall.

On the other hand, a well kept secret has been FaxPack's ability to handle voice messages. Now that the file transfer software has been finished at last, what better than to surprise patient users with the bonus of an extra software upgrade to turn their *FaxPack* cards into answering machines? And it's free too.

TRANSFERRING FILES

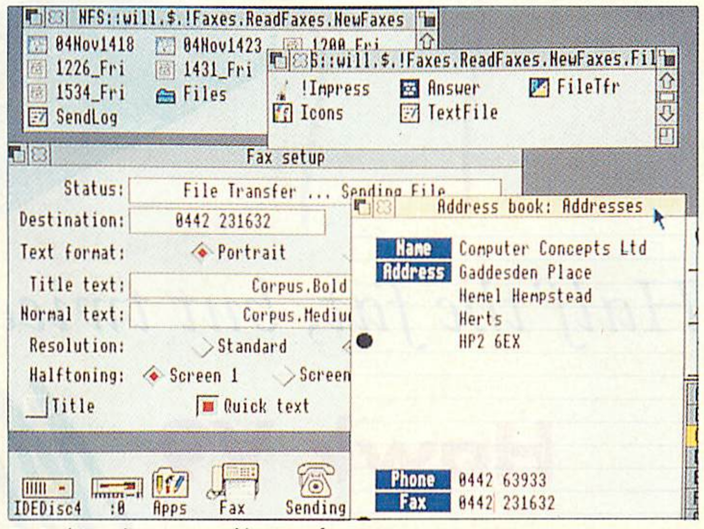
FaxPack is a 9,600bps fax modem. There is no widely adopted standard for using fax modems to transfer data files. The latest modem chips combine both data and fax modem functionality but, alas, the CC FaxPack hardware design was frozen just before these chips were introduced.

The card has connections for a piggy-back data modem upgrade but this has never been exploited. Therefore a FaxPack couldn't be used with bulletin boards or public email services. Until now, FaxPack was strictly limited to sending and receiving fax documents.

Aware of FaxPack's limitations, CC decided to implement a way of letting FaxPack users transfer files between themselves.

The result is that you can select either a single file or a file directory for transmission to another FaxPack. Selected file groups are not yet supported. With the send file menu option enabled and a destination fax number selected from the address book or entered in the fax send dialogue, all you do is drag the file or directory icon onto FaxPack's *!PrinterFP* on the icon bar. This sends files to the receiver's fax directory.

Unlike conventional comms, FaxPack doesn't use a terminal emulation. Sessions are either completely automatic or you can manually issue file commands after dialling up and connecting your FaxPack.



FaxPack's main trump card is ease of use

A *SENDFILE <file/directory> <destination pathname> command is available to direct sent files to specific destination directories, however the sender must have 'permission' to access these directories.

Permissions are set up in a special text file called 'Access.' All FaxPacks have a unique serial number which can be used to assign access to named directories by one or more specific FaxPack user. To allow anybody access you simply substitute the serial number for the parameter ALL. There is no facility to restrict access by user-changeable passwords, which could be a problem if more than one person has access.

As well as *SENDFILE there is a *GETFILE command for grabbing a known file or directory and you can check what's on the remote FaxPack machine using *LISTFILES.

FaxPack transfers data at a rate of about 1Kbps. This is effectively doubled using LZW data compression if text is being transferred.

Performance is respectable, though marginally below that possible with a pair of conventional V32 (9,600bps) modems. Increasingly popular V32bis (14,400bps) modems, leave FaxPack struggling.

The beauty of FaxPack's oddball file transfer system is that the user is not confronted by complex procedures.

The other side of the coin is that FaxPack is non-standard. With luck, the number of FaxPack users will grow and so diminish this problem.

As a dedicated comms user I am still left with the feeling that FaxPack is a missed opportunity because it isn't compatible with conventional modems. Having said that, FaxPack's file transfer capabilities have turned out to be more than just a gimmick.

ANY ANSWERS?

Bundled in with the new FaxPack file transfer upgrade is another application to turn your FaxPack into an answering machine. If the answering machine mode is selected, FaxPack will answer a call, and play a pre-recorded outgoing message. Next it both listens out for an identifying bleep from another fax machine on the line and starts recording a message.

If somebody starts speaking, the message is recorded digitally as a data file, complete with handy time and date stamp. If it turns out to be a fax call or the caller hangs up, the recording which was started gets deleted.

Samples are stored in Clares *Armadeus* format, uncompressed. Conventional LZW compression, as used in the FaxPack file transfer system, is very inefficient when applied to audio samples.

CC provides an *Armadeus* playback module so you need only double click on the file icon to hear it. However, recorded sound quality is very good, almost indistinguishable from the original call.

If you have a reasonable amount of free hard disc space, FaxPack can be configured as a basic answering machine with good audio quality. A third-party sound sampler is a necessity.

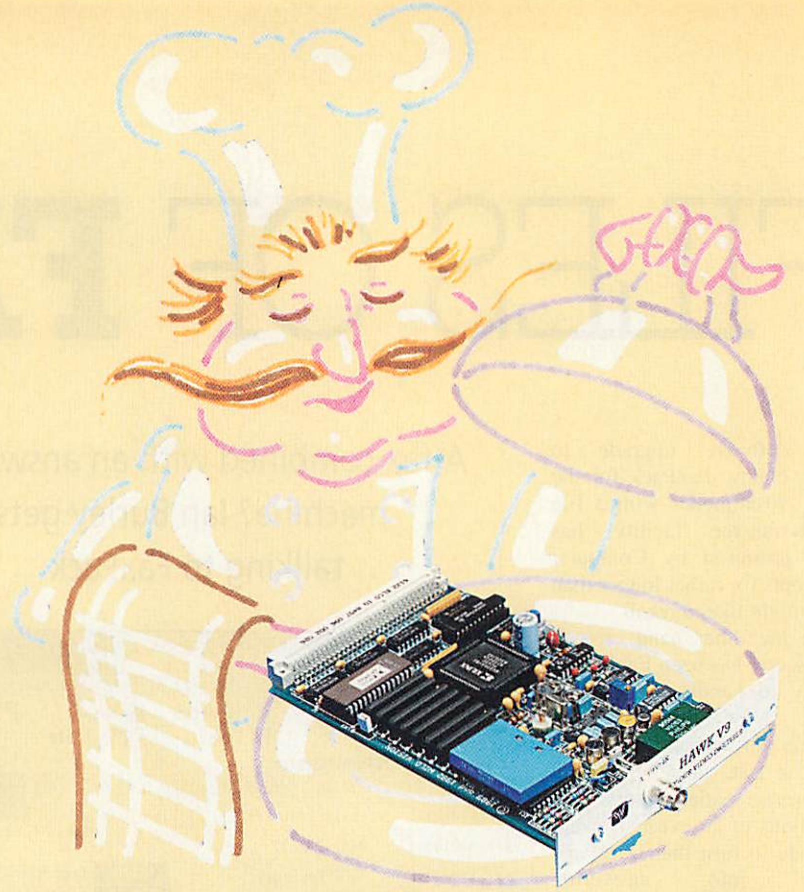
There is no remote control facility, so you can't check your messages when you are away or delete unwanted ones; a key issue if you have limited hard disc space. You can't change the outgoing message remotely either.

The potential is there, but all CC has supplied is a rather bare-bones emulation of an answering machine. It's interesting to play around with, but it wouldn't oust my standalone machine in its present state.

PRODUCT DETAILS

Product: FaxPack
Supplier: Computer Concepts, Gaddesden Place, Hemel Hempstead, Herts HP2 6EX
Tel: (0442) 63933
Price: £299 (or free upgrade)





Half the fat, but twice the flavour!

Hawk V9 MKII

Hungry for a video digitiser? Now, the Hawk V9 MkII is what you'd call quite tasty. Deliciously clear digitised video live in a desktop window, almost like TV. Mmm mmm, the cream bun of digitisers, with only half the calories! We've slimmed the Hawk V9 MkII down to single width, giving you the space for further expansion card consumption. (We could name a few tempting morsels...).

These new ingredients are added to a successful digitising recipe. The Hawk V9 with its !FastGrab software was one of the first names to become really established as a quality digitiser for the Arc. We're simply in the process of putting the icing on the cake.

Recipe and instructions

The live video display is dithered in hardware, thanks to the latest programmable gate array technology (such as you'd find in Computer Concepts' LaserDirect and Scan-Light cards). Grabbing a sprite, either to save or drag directly into another multi-tasking package couldn't be easier. Because the images are enhanced before reaching the screen, it is possible to simply point, click and save. Of course, the image manipulation routine ChangeFSI is still included if you wish to mould your image further. The whole process is fast, friendly and flexible.

And just to whet your appetite, we promise that the price won't make you throw up (although it might sicken a few competitors!).



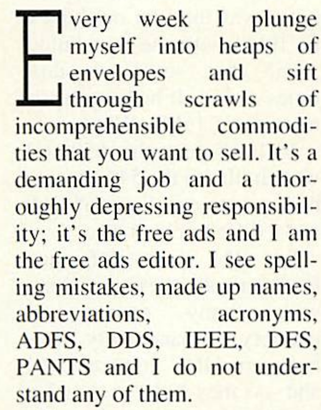
Go on, Tuck in!

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England.
Tel: 091 519 1455
Fax: 091 519 1929



Sarah Burns, free ads editor, wants to know what you people want really want out of life

ABSOLUTE BEGINNERS



Every week I plunge myself into heaps of envelopes and sift through scrawls of incomprehensible commodities that you want to sell. It's a demanding job and a thoroughly depressing responsibility; it's the free ads and I am the free ads editor. I see spelling mistakes, made up names, abbreviations, acronyms, ADFS, DDS, IEEE, DFS, PANTS and I do not understand any of them.

You do come across some funny spelling in Free Ads; I always wondered whether what part of the country you came from determined the spelling of disc or disk. Disk is short for diskette but as an Essex girl I always go for the c option. *BAU* style runs this way too.

For research purposes, I once made the mistake of asking someone exactly what a second processor looked like and returned to my desk to find a lump of a machine with wires hanging out of the back sitting there. No wonder everyone's selling them.

Unfortunately we're not all blessed with beauty and brains. This processor might have looked incredibly ugly but it's apparently it's a mathematical genius. Some actions slow the computer's main processor down, like graphics – so the second processor tackles the programs while the original concentrates on the graphics alone.

Don't expect to see a dual processor though, because that's inside the computer. In actual fact there are two. One processor is often in the keyboard and linked to the main processor inside the computer. Its purpose is for keyboard control. However, most computers these days have a dual processor to manage the memory, graphics displays and, often, the maths. This makes the machine far more efficient and super-speedy.



ELLIS NADLER

It has come to my attention that loads of the computers for sale are fitted with Risc OS. Our systems manager kindly took the computer apart to explain this to me. Risc stands for Reduced Instruction Set Computer and OS is Operating System.

Risc OS basically makes the machine work. It provides you with services that can access the hard disc, networks, floppy disc and the desktop. It's responsible for keeping track of the hard disc filing system.

It receives instructions from the keyboard so when you press a key, it reads the letter and prints it on the screen. Risc OS is not an application like *Impression* and *Paint*, it's just a basic system and it's actually the applications that make use of it. Even though Risc OS is stored in four memory chips called Roms; remember chaps, it's a piece of software, not hardware.

Disc drives can be just as confusing. Some old machines have a 40-track drive while others have an 80 track drive. Then there are those with a 40/80 5.25in twin disc drive. So what's the difference between a 40 and an 80 track drive; and for that matter what exactly is a track?

The disc drive is the part of the computer that reads your floppy discs, whether 5.25in or 3.5in. Just like a record, a disc has circles on its surface that stores information, but you can't see them as they are magnetic patterns. Obviously a 5.25in disc with 80 tracks has more storage space then one

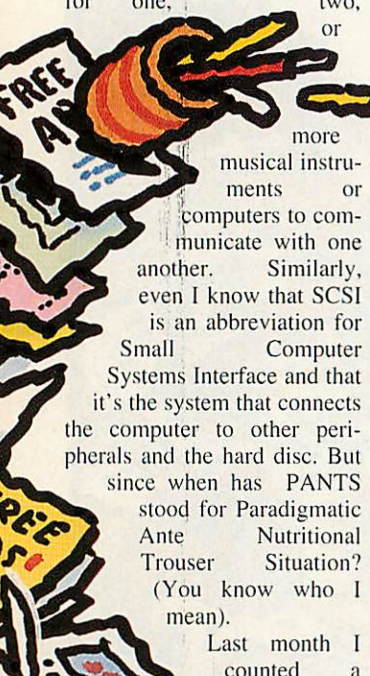
with only 40 tracks. Now a machine that has a twin 40/80 drive can read both 40- and 80-track discs (incidentally, all 3.5in discs have 80 tracks). There is another distinction here: single, double or high density. HD only applies to the most recent Arcs and low density discs are a rarity.

If you have been the victim of a computer crash or one of your precious discs have been corrupted then call for the disc doctor program; there's always a few of these sniffing around the free ad pages. These discs are quite marvellous as they are really the only way of recovering information from a poorly disc.

Some readers make up their own abbreviations. We can all agree that Midi stands for musical instrument digital interface.

Midi is an agreed standard for one, two, or more musical instruments or computers to communicate with one another. Similarly, even I know that SCSI is an abbreviation for Small Computer Systems Interface and that it's the system that connects the computer to other peripherals and the hard disc. But since when has PANTS stood for Paradigmatic Ante Nutritional Trouser Situation? (You know who I mean).

Last month I counted a number of PC Emulators in my free ads bag; spelt in a variety of ways. These here PC Emulators allow your Acorn machine to run software that is actually designed for the inferior PC-type machine. It's not really that good for games as most of them need speed and the Emulator often slows your machine down. Shame it can't emulate correct spelling, really.



SOME ABBREVIATIONS

DTP (Desk Top Publishing): An alsomt ererr-free method of producing pages for books, newspapers and magazines.
DFS (Disc Filing System): A program that fails to manage the disc drive
VDU (Visual Display Unit): TV, monitor, screen (non-paper stuff you look at)
Mb (Megabyte): Unit of measurement for computer memory; equal to one million bytes. Wow, but, like you know it ain't much these days
Risc (Reduced Instruction Set Chip): The Arm2 and Arm3 are reduced instruction set chips; there are others but we don't think they're as good
PD (Public Domain): Often felt to mean common ownership of a program so it can be distributed without any charge. It doesn't of course
RGB (Red, Green, Blue): Computer peoples' favourite colours; magazine people prefer magenta, cyan and yellow

Arm3, advanced Risc machine (three), always sounds so important and believe me it is. It's so little yet it's the big boss. It does all of the hard work, like adding and subtracting and tells the other chips inside the computer exactly what to do. The new Arm3 is four times as fast as the old Arm2 chip. It's difficult to upgrade some machines with an Arm2 chip in, as they are soldered into the machine rather than placed in a socket. Don't try this one at home kids; at least not on an A3000. Take it to your local dealer instead.

Now I'm not one to moan but I receive some absolutely disgraceful handwriting. Take buffer for example. It's inexcusable the way some people scrawl this. A fine piece of equipment though. It's a memory that can be used for temporary storage, (something I could do with). When a fast piece of the machine is exchanging data with a slow-acting part or peripheral then the buffer will store the information until it can be dealt with. Most laser printers and some dot matrix printers have their own buffers otherwise they would hold up the computer for absolutely ages.

So what's the difference between all these computers that everyone's trying to sell? Here's a bit of history; the BBC B was the best-selling micro for Acorn back in 1982. It had, well, still has usually, a 32K memory and an operating system called OS1.2. Also *View* and *WordWise* Roms can be added for word processing. It's a very simple computer but slightly popular; half a million were sold from 1982-85. Yes, in its day, the BBC B was the Rolls-Royce of home computers – just rather more affordable.

Following this came the Master 128 in 1986; sort of a super BBC B. It had more memory and keys but the speed and graphics were the same as the old Beeb. The Master Compact was launched the same year with the difference, among other things, that is had a separate keyboard. Both the Master 128 and BBC B are two box machines; the actual computer brain is stuck to the keyboard so it's one big box and the monitor is separate.

The Archimedes range first appeared back in 1987. Hello to the 310 . . . it had 1Mb of memory and an Arm chip but no Risc OS (someone called Arthur did the job instead). At the time it was hugely impressive and the most powerful home computer known.

When Risc OS arrived on the scene in 1988, a new era began for Acorn. The 310/1 and the 440/1 were modified versions of the 310 and 440. The only difference is that they had a big socket for the Risc OS chip so they could be upgraded to the then new Risc OS 2.

The A3000 was launched in July 1989 at the *BAU* show, actually the hottest day of that year at 33C°. It's only a two-box machine (monitor and computer) and you can only add one Archimedes style podule. A mini podule slot inside the computer allows special produles to be fitted. Most suppliers do alternative versions of their large podules for this smaller slot, which is incidentally the way more modern Acorn machines, such as the A3010 and A4000 are expanded. With a 1Mb memory, A3000's are good for games.

An A540 was like the 440 but it was the first machine to be fitted with the fantabulous Arm3 chip, so it was three times as fast. It had a potential memory of 16Mb. Whoo.

In 1991 came the A5000. It was similar to the 540 except it had a memory limit of 4Mb and a different hard disc.

So, the key differences between all these machines with funny numbers is memory, expandability (how many podules you can add) and do they have an Arm3 or not? Now you know.

NOW READ THIS

For anyone considering placing a free ad in the near future, it's time to discuss a few very important rules. Firstly, 25 words really does mean only 25 words. No cheating with sneaky made-up abbreviations please. When unabbreviated, many free ads are well over 30 words . . . tut tut.

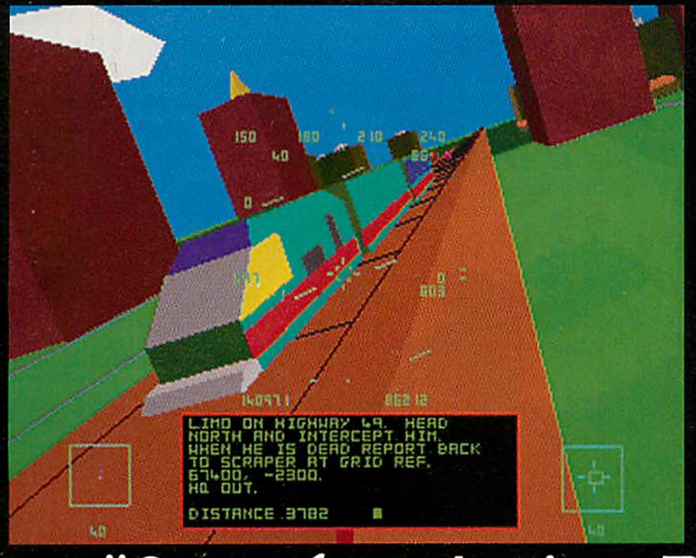
It's not that difficult; but *do* try and remember to include a name, phone number or contact address. Write your ad in clear, readable block capital letters. We don't have time to check words we can't read, so anything illegible is thrown straight into the dustbin; no exceptions.

When you send an ad to us, we can't necessarily include it in the next available issue; sorry. At the moment there is a huge backlog of free ads which I am fighting through. If you sent one in months ago and it still hasn't been printed, don't panic and under no circumstances call us; it will eventually go in.

On a more serious note, we have received a few rather dodgy free ads, sort of organised crime, lonely hearts and CID affairs. Be very certain who you are purchasing secondhand computer goods from and contact us immediately if you think you've discovered anything suspicious.

PRODUCED by The Fourth Dimension .... THE 32-bit Acorn Games SPECIALISTS

Chopper Force





"Superfast Action-Packed Chopper Sim"

Superb 3D graphics, stunning sound effects and rivetting gameplay combine in this futuristic helicopter simulation. The Chopper Force is an elite band of police helicopter pilots set up to combat the modern terrorist.

ADVANCED HELICOPTER TECHNOLOGY

Gone are the old-fashioned dials and indicator LEDs of 20th century technology. Instead a sophisticated head-up display and a wide-screen monitor are provided. The monitor brings all relevant information straight to the attention of the pilot - saving the constant scanning of dials and indicators. The helicopter is equipped with powerful retro-rockets which when activated give it much of the power and speed of a jet. With the retros off the full manoeuvrability of the helicopter becomes available. Landing on skyscrapers and lifting equipment with a rope becomes possible.

RANKING SYSTEM

As you climb through the ranks extra equipment will become available. You will also gain privileges such as access to satellite surveillance. Ranking credits will be given for destroying any terrorists that are about when you do your mission as well as for achieving specific objectives.

Ranking debits are given for friendly-fire or civilian casualties that you may cause. To improve your rank you may redo a mission to try and get those terrorists that were missed the first time. Each player has his/her own personal file protected by a password that records what you have achieved so far.

LARGE MAP

The whole game takes place in one gigantic arena with a superb variety of buildings, roads, rivers and other objects. There are over 20 fascinating and varied missions that will test even the most experienced flight simulator fans.

STUNNING SOUND

A large variety of samples have been recorded at a high quality sample rate. The doppler effect is fully implemented just as it would really sound. The volume is correctly calculated using the inverse square law.

SUPERB GRAPHICS

More polygons than ever before are seen at a smooth frame rate. And yet the vector code is extremely flexible, allowing views from EVERY conceivable angle which is made use of with an impressive list of view/ tracking facilities.

COMPETITION

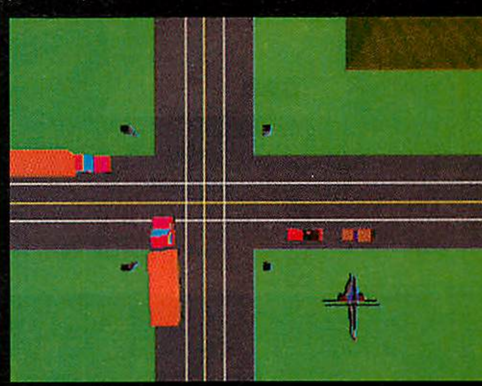
Super prizes can be won by top scoring pilots.

For All Acorn 32-bit RISC Machines Including all A3000s, A3010s, A3020s, A4000s, A5000s & all Archimedes Price £29.95

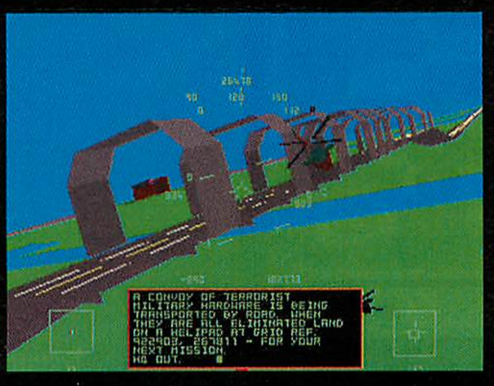
The Fourth Dimension, 1 Percy Street, Sheffield, S3 8AU. (0742) 769950 or 700661

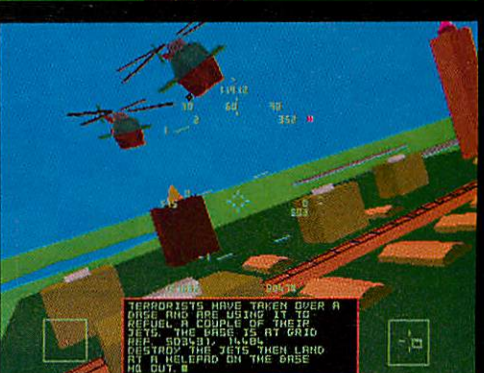












PRODUCED by The Fourth Dimension .... THE 32-bit Acorn Games SPECIALISTS

SPECIALIST Acorn Software



Chopper Force £29.95 (Hopefully October '92)



Pandora's Box** £25.95



Grievous Bodily 'ARM £25.95



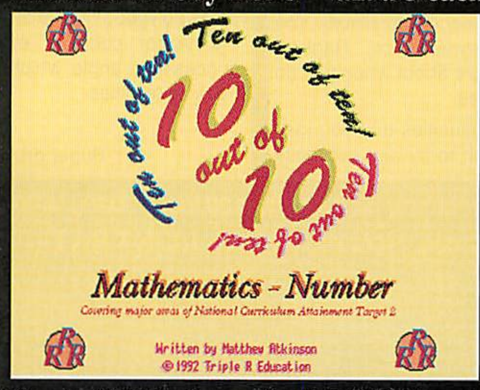
The Real McCoy 2 or 3** £29.95 each



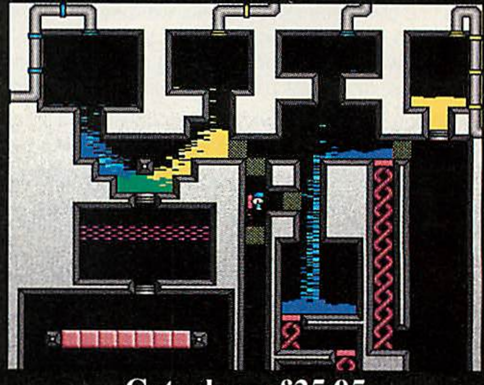
Enter The Realm** £25.95



Chocks Away Compendium** £39.95



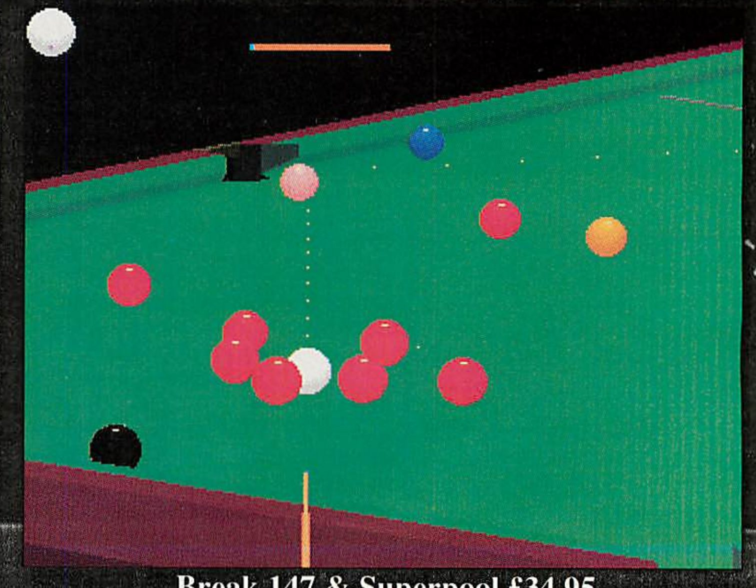
10 out of 10 Maths or English £25.95 each



Cataclysm £25.95



Cyber Chess £49.95



Break 147 & Superpool £34.95



GAME SHOW

There are a record number of good quality games available this winter and, oddly, given the recession, they seem to be going like hot cakes. Sadly, some of the stars are not around: titles such as *Sim City* from Krisalis and the shoot-em-up *Scorpius* from Arxe Software will not be ready until some way into the new year. However, just about everything else will be, including some games that have not received much coverage yet.

Software 42 is a new company and it has just released *Ixion*, a fast moving, futuristic space adventure. In *Ixion*, your task is to escape from a planet full of criminals and strange life forms using ever ounce of weaponary available, with which to shoot-it-if-it-moves, and also the grey matter between your ears to solve the various puzzles which crop up along the escape route.

Hot on *Ixion's* blazing trail will come a beat-em-up game called *Raw Power* in which a whole bunch of muscle-bound dweebs come asking for it; and get it, with a dangerous range of unpleasant weapons. *Raw Power* can be played with one player or two, so you can work as a team or, when that fails, bash the lights out of each other instead.

A platform game is also on the way from Software 42. *Cycloidz* is a silly game in which balloons are the enemy: they invade and you blast them to bits! According to the authors, this is the only game that gives you the chance to guide a cute clown around the screen on the back of a unicorn. Hopping frogs and bouncing balls present themselves from time to time if you get bored with shooting balloons and a wide variety of power-ups which turn your nose a different colour are also available! Software 42 is on (0702) 230469.



Psychedelic Rockers: it's cheap, legal and mildly addictive

A budget game just out is *Psychedelic Rockers* from Green Angel Design (0532) 480190, which sells for only £9.95. It was written by the author of some early Commodore 64 games – and it shows – but it's a cheerful two-dimensional arcade game with tiny characters and mundane monsters.

UPGRADE UPDATES

Revised versions of two recent games have been released by their publishers. *Spheres of Chaos* from Matt Black Software is the *Asteroids*-type game, that looks like a firework display, reviewed in last month's *Acorn User*.

It has been given a difficulty control system which allows players to set the level best for them and includes the possibility to slow all the action down a bit too! Also included are black holes which appear at random, that immediately suck your space ship – and everything else in sight – alarmingly, into one infinitesimally small point, unless you can destroy the hole first.

If you have bought *Spheres of Chaos* but have an earlier version you can receive a new one free by sending your game disc with an SAE to: Matt Black Software, PO Box 42, Peterborough, PE1 2TZ.

Cyber Chess, from The Fourth Dimension, has also been improved. If you have found yourself hammering the computer every time you play – in which case, in my opinion, you must be God – you can send your discs back to The Fourth Dimension for a free upgrade to a version with a much stronger end-game. The address is: 1 Percy Street, Sheffield S3 8AU.

NEWS NUGGET

Rumours have been flying round for months of a new games console that uses Acorn 32-bit technology but only now is it set to be launched, first in the USA, then here in Britain.

The console, produced by the Japanese corporation Matsushita, will contain the Acorn chip set and a specially dedicated graphics chip, allowing for 24-bit colour, that will produce games to 'knock the socks off anything seen before on any Acorn, Amiga, Sega and even Nintendo', according to one source.

Games will come on compact discs, each storing over a gigabyte of gameplay, graphics, music and sound. First out are *Wing Commander* and *Wing Commander 2*. The console will probably cost about £400.

Sam Greenhill

COMPETITION

This month you could win the chance to see your name in lights and have your article printed in Game Show, in this special writing competition. The task in hand is simple. We want to read your feelings about the game you enjoy most on your Acorn 32-bit Risc OS computer.

In the games supplement last month we asked 11 people at *Acorn User* to write about their favourite game and the variety of response was great. Some people preferred certain arcade games, such as *MiG-29* and *Swiv* for their action and 'adrenalin'; others went for the more brain-draining types, like *Wonderland* and *Populous*. Well, how about you?

To enter, simply decide which Acorn game you like the most and write about 500 words in a humorous and informative style on why you think it's the greatest. Then, send your article with the completed entry form to us and the best we get will be printed in *BBC Acorn User*.

Name:..

Address:..

.... Phone:....................

Favourite game:..

Game published by:..

Send your entry, before 31 Jan 1993, to: Favourite Game Competition, BBC Acorn User, 101 Bayham Street, London NW1 0AG

GALACTIC DAN

The Fourth Dimension
Tel: (0742) 700661
£25.95
Risc OS machines

You are Galactic Dan, a special agent of the United Planets Bureau of Investigation – a sort of intergalactic FBI – equipped with nothing but a T2 plasma rifle and a keen set of wits with which to save the Poloids.

Poloids are an oppressed population of peace-loving, poetry-reading intellectuals, who actually seem more to resemble bowling skittles rather than the Athenian types they are made out to be.

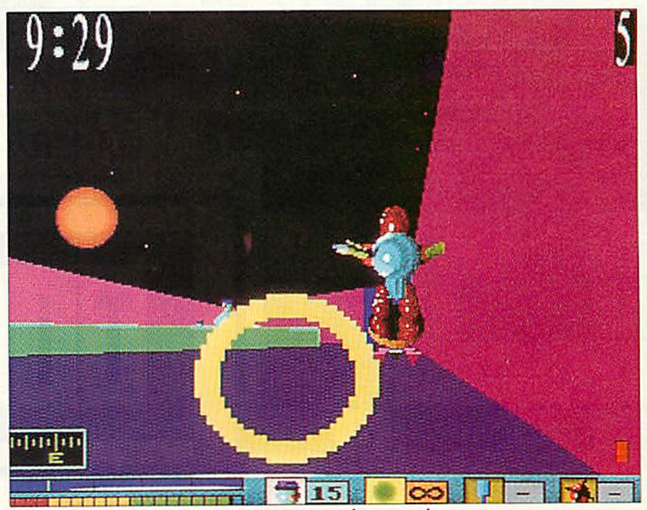
You roam around a three dimensional maze – a network of multicoloured corridors, platforms and rooms – rescuing hostages while fighting off an enormous array of 'Vorian attack robots', ranging from large purple spiders (with rather less than eight legs) to 'Rotor Guns' that bear a strong resemblance to eyeballs.

Dan is controlled using mostly the mouse but precise navigation is tricky and collisions with the walls are common, sometimes causing Dan to grunt loudly and me to pull my hair out in frustration.

The keyboard offers the more competent player greater control of Dan's movements, including the ability to shoot sideways and, later in the game, to make use of a wider range of weaponry.

To rescue a Poloid hostage, Dan runs into them and gets a smarmy, 'Hmm, thank you' for his trouble. However, an accidental slip of the trigger finger can send the peaceful poet, complete with halo, floating gently up to the great skittle maker in the sky.

The mazes get bigger and harder as the game progresses, making it increasingly difficult to avoid going round in circles, leading me to think the addition of a map would be a welcome feature to the game. It is highly frustrating to find yourself running out of time while wandering about a seemingly endless maze in search of the exit.



Guardian-reading Dan rescues yet another gentle poet

Graphically, Galactic Dan could be better. The maze walls are featureless planes, garishly coloured, and would benefit from some texturing. The alien robots look an awful lot better but they still lack true depth and don't seem to be able to give much more than a 'cardboard cutout' impression.

Sometimes a tricky leap between platforms to reach a distressed Poloid can bring a certain sense of achievement but, overall, the game is essentially boring, with long periods of inaction in endless corridors and then a few brief moments of combat with robot spiders and the like; all moving too quickly to provide more than a fleeting glance.

Andy Lee

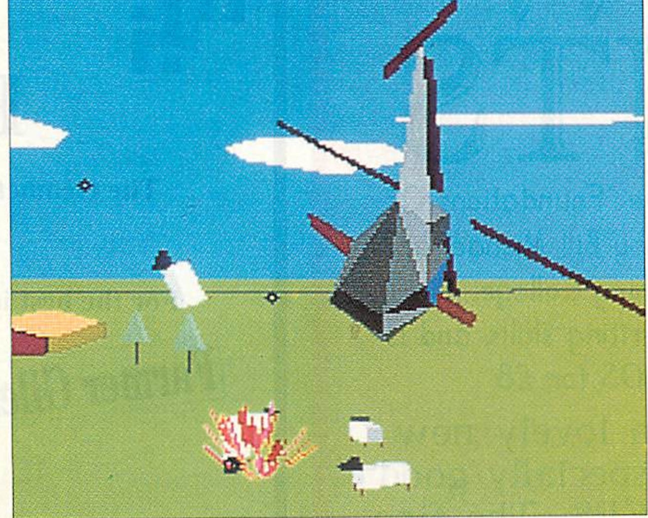
CHOPPER FORCE

The Fourth Dimension
Tel: (0742) 700661
£29.95
Risc OS machines

As the engine strains itself to shift the rotors, the blades begin slowly to turn and the noise builds up into a smooth blend of mechanical crescendo and the whoosh of air as the blades swing passed faster and faster. The mission has begun.

After about 10 seconds, you are ready to take off. This is no ordinary chopper as you soon discover, because a powerful jet engine is bolted usefully on to the back. This essentially converts the chopper into something like a jet fighter, so flight sim users will find control of the beastie – via mouse – no problem.

The first mission is to seek out and destroy some evil terrorist nutter who is cruising up the highway in his black limo, oblivious to the dangers of low-flying, cannon-wielding helicopters. The jet thrusters are used to get near the guy, then you enter hover mode to glide calmly along beside him before opening fire with both cannons.


Ah, the days when choppers were choppers and sheep were scared

In hover mode, the chopper can move directly up or down, turn quickly around and fly (slowly) in any direction. The range of viewing positions is impressive: from inside you can rotate your head through 360 degrees (you are no ordinary pilot, either) and from outside the chopper can be seen from any angle and any distance, including from above or below.

On some missions it is necessary to transport cargo around the scenario and you do this by dangling a rope from the chopper and winching up the crates. Then you fly around, dragging them through the air, and it's not the best of times to meet a Mr Versatile enemy helicopter.

The baddie-type choppers are pretty good opponents, but do occasionally display supernatural traits, since bullets appear to pass straight through them, and how they manage to get so close without colliding with my chopper's blades, I don't understand.

The missions themselves get harder but comfortably feasible as time goes by and Mission HQ awards pilots with rockets and satellite access after bouts of success.

There are two, related, problems with *Chopper Force*. The first is that the game is not 'super fast'. When it takes a good few seconds even to cross the road much of the adrenalin fades away and you feel just a tad bored. This manifests itself in another way: it takes half the day just to reach a target black limo, never mind the other half to get home.

These don't completely spoil *Chopper Force*'s addiction but they seriously limit what could otherwise be a very good time.

Rob Miller

CYBERZONE

Available from local dealers
£24.95
Risc OS machines

Imagine a cross between role-playing and adventure with a little arcade action thrown in, and you have *Cyberzone*. In keeping with most games of this nature, *Cyberzone* is set in a large maze through which you must travel, while thwarting the evil killer droids.

Rather than the standard pair of legs, you must travel around on wheels. Yes, you've guessed it; you're a droid as well. Being a droid is not too bad actually, if you've got the money.

Dotted around the maze are a number of shops where you can buy extra weapons or even trade yourself in for a better (for 'better' read 'more destructive') model. As well as hardware, there are also a number of programs on offer that you can run to help you find your way around the deadly maze.



Weapons are a droid's best friend

Travel around the maze is via a few simple controls; left, turn and forward. A rather plain view shows the maze in the direction you are looking and an overhead map can be accessed if you've bought one at one of the shops.

When you start the game you have the most basic of weapons and software. The only way of accumulating enough money to upgrade, is by fighting and destroying the killer droids, most of which have considerably greater fire-power than yourself.

An encounter with a nasty means you can do one of two things. Either stand and fight, or run (wheel) for your life. Choosing to fight results in you and your adversary loosing successive stamina points. The first one to zero dies.

If you manage to get past a few of the enemy droids, you'll get the chance to try and log in to various computer terminals dotted around the maze. All require individual passwords to gain access.

Graphics and sound are fine, if a little confusing at times. One sound effect had me rather worried: a rather nasty grating sound that I was convinced was coming from my hard disc.

Cyberzone is billed as a Role Playing Game and it just about qualifies. The various other elements make it interesting for a while but the novelty soon wears off. There's nothing particularly wrong with *Cyberzone* though, except the price, which is too high. It might appeal to hackers and *Terminator* fans, but I would prefer to spend my money on something else.

Andy Lee

CYBORG

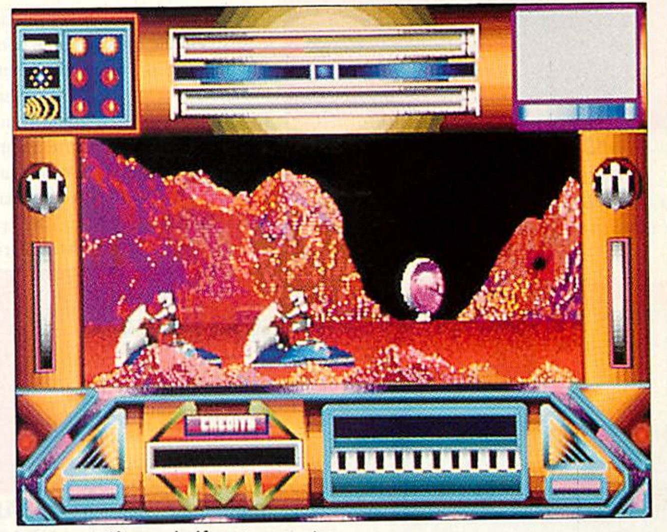
Alpine Software
(0762) 342510
£25.95
Risc OS: 3 x 3.5in discs

The format of Alpine's latest release is highly original; *Cyborg* is a hybrid arcade game/adventure game, but it turns out to be only reasonable in each of these areas rather than good as a whole. Supplied on three discs containing highly compressed data, the game was put together on Alpine's own game creation software, and although the results are acceptable they are some way from the sort of standard Arc gamers are coming to expect.

Arcade stages are played alternately with adventure stages, at any of three difficulty levels. If you prefer, you can play whatever parts of the game take your fancy, but if you want to complete it, you must do the whole thing in one go. One annoying feature is that you have to swap discs and reload from scratch if you die and wish to play again.

The loading music is either a) a joke, b) corrupted data on the disc, or c) the work of someone with an, er, unique taste in music. This was compensated for by an atmospheric animation, which shows the grid-outline of the horribly beweaponed *Cyborg*.

The arcade sections take place in a box of about half the area of the screen, which is a window on to the surface of an alien world. You can scroll left and right with the mouse (through levels of groovy parallax), shooting objects and picking up energy pods. As you progress, there are a number of nice effects: a volcano you can erupt at will, swarms of flies, hover-cameras and walking robots, but the animation and scrolling are not smooth enough for my liking.



Cyborg: half man, half motor scooter

Graphically, the arcade sections are patchy; excellent in some places but questionable in others. For example, the status screen is very distracting, with only a few of the many garishly coloured knobs, dials and panels have any function at all. Sound is rather better, with most of the samples adding to the atmosphere nicely. The action levels are not very large, and are very difficult.

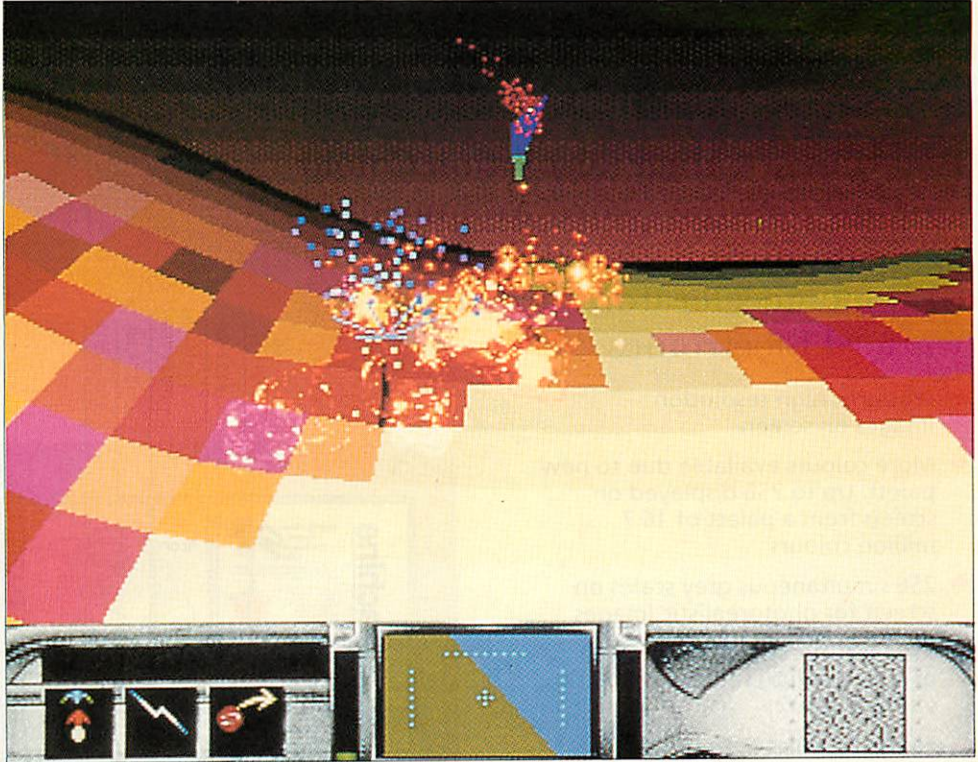
Unfortunately though, it's not the kind of difficulty which creates the urge to have another go, merely the kind which irritates after a while. The adventure stages are more enjoyable and challenging.

A great concept, and a commendable attempt at realising it, but I'm afraid that *Cyborg* will fare badly in a market where games are getting better all the time.

Mathew Tizard

ALDEBARAN

Evolution Trading AG
Tel: 41 31 747 65 31
(Switzerland)
£34.90
Risc OS machines


That's taken the zarch out of that one . . .

If you've been wondering which game the ship on last month's cover sprang from, the answer is *Aldebaran*; the new mega-game from the Arc Angels team in Switzerland. *Aldebaran* has been over a year in the making and is one of the small handful of games I've come across that actually *looks* as though it was written for the Arc.

The game installs without fuss on the icon bar (other games producers take note), and is entirely mouse controlled. When you click, you are whisked to the desktop of a terminal on the base of one of the planets in the Aldebaran solar system.

The story so far is that a bunch of maurauding aliens have been syphoning energy from your local star (Aldebaran) using an asteroid fitted with a dastardly conversion ray. Unfortunately this is causing the star to shrink, and as the game commences you have about a week (in real time) to do something about the asteroid before the star goes nova, taking you, the solar system, and a sizeable chunk of the galaxy with it.

Since everyone else has gone to hide behind the sofa, you've been landed with getting them out of this mess. Your job is to supervise the construction of various projects (consisting of both offensive and defensive measures) that have been devised to avert the impending catastrophe. Before you can get going you have to mobilize the brains behind the ideas; the professors, who are scattered around the solar-system.

Each boffin is skilled differently in a variety of fields (computer science, astrophysics and so on) and you must decide who is the best person to assign to each project, and ferry them about to the appropriate labs.

On top of all this you're expected to gather and deliver the different resources required to construct the components they need, which are there for the taking on the surfaces of the planets. To top it all the area has just been invaded by robot drones sent from the aliens, who are distinctly miffed that you should want to disconnect their power supply. As a result, they frequently kidnap the professors who are your only source of expertise.

Just to make your day, you're not allowed to just zip between planets at will. Technology hasn't quite got that far. Hyperspace travel is possible, but only over a limited distance. Unfortunately, because the planets of the Aldebaranian system orbit the star at different ranges and speeds, the distances between them change over time.

This means that if you want to go somewhere at the wrong point in the orbital cycles, your destination will be out of range. This idea is vividly brought to life with the help of an illuminated, 3D model of the entire solar system. You can see what happens to the positions and distances between planets over time by charting them as they gracefully whiz round the star, and then you pick your moment by using the model to see when the target planet will next be in range.

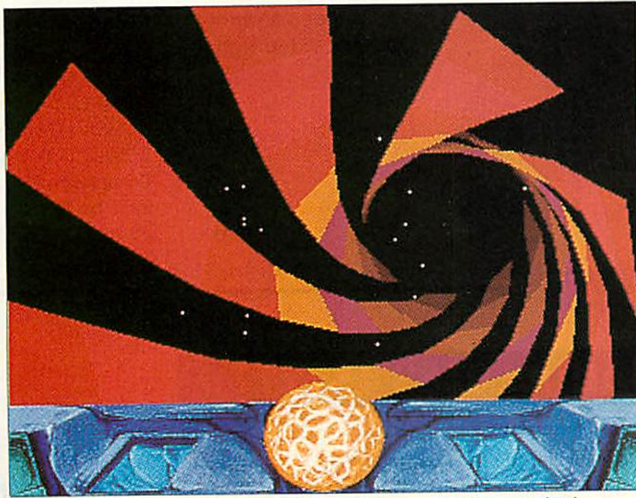
Once all that's been sorted out, there follows a stunning animation sequence (different each time) which shows the hyperspace journey as a sort of kaleidoscopic tunnel of rotating noodles.

Graphically, the game is an eye-popping mix of animated sprites over vector graphics, with a dash of realtime texture mapping in there as well. All surfaces are lit with respect to the appropriate light sources, everything has a shadow and an ingenious dithering routine is employed, effectively doubling the number of colours on screen.

The sprite-based graphics were hand-painted and then scanned in, to give a really polished look to the game as a whole. Frame rates are high throughout (at least 20 per second) and that's on my trusty A3000.

Although a tad more expensive than most current releases, Aldebaran is excellent value for money when compared with them. The game is a real challenge and a visual feast to boot.

Mathew Tizard


It's either a hyperspace jump or the worst hangover I've ever had

Eureka!

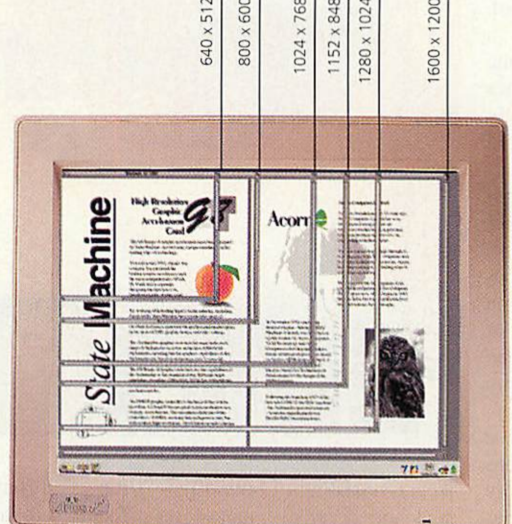
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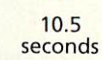
Performance test on A440/1, ARM2






23 seconds

10.5 seconds





640 x 480 x 256 without G8 card

640 x 480 x 256 with G8 card

Operation time in seconds

0 10 20 30 40 50 60 70 80 90 100

Normal, G8 Accelerated, Sheer, Rotate, Anti-aliased Sprite redraw, Flood fills, Complex redraw, Image enhance

A comparison of speed performance between a standard A440/1 and one fitted with a G8 Accelerator Card from State machine.

Specification

Maximum Resolution (Square Pixels)	1280 x 1024 @ 4 colours 1152 x 848 @ 16 colours 800 x 600 @ 256 colours
(Rectangular Pixels)	1600 x 1200 @ 16 colours 1152 x 848 @ 256 colours
V. Scan Frequency	*56-110Hz (NI), 87Hz (I)
H. Scan Frequency	*31.5-75KHz
Video Memory	512KB
Output Video Signal	Analogue RGB (RS-343A) Compsite grey level 15 and 9 pin connectors
Sync	H. Sync (TTL Level) V. Sync (TTL Level) Composite (TTL Level) Sync on Green
Palette	24 bit (16.7 million colours)

*Mode dependent, (NI) = Non Interlaced, (I) = Interlaced



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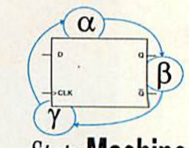
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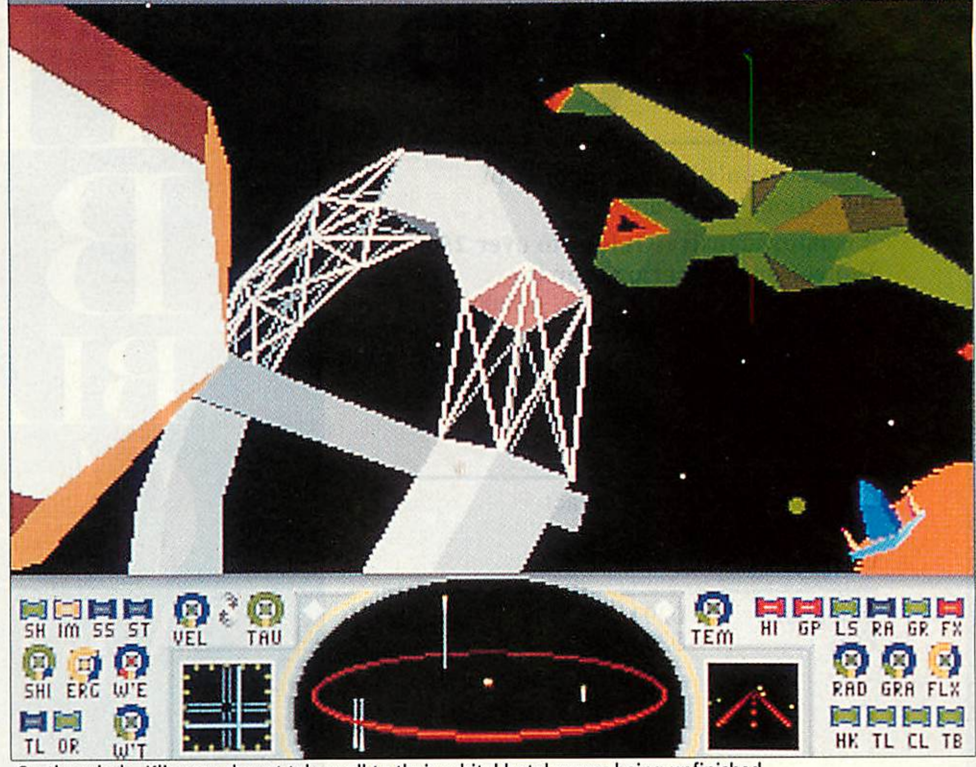
State Machine

75 Upper Wellington Street, Luton. LU1 5AA. (0582 483377)

* Add VAT and £5 for carriage

BLACK ANGEL

The Fourth Dimension
Tel: (0742) 700661
£34.95
Risc OS machines



On the whole, Klingons do not take well to their orbital hotel rooms being unfinished . . .

Don't you just hate it when that happens? You spend three quarters of an hour scouring the house top to bottom looking for your keys when suddenly some tells you they've been hidden in alien artifacts orbiting distant planets, so before you can unlock the shed to mow the lawn, you've got to jump into your Maan Industries Kestrel (a nippy little spacecraft if ever you saw one) and blast off into the depths of space! Must be a Monday morning.

Black Angel is a 3D space game, so nothing new there. It does, however, have elements of an adventure included. As hinted at above, you've got to find some keys (there are eight) to unlock the secret of the stargates.

The adventure comes in because you are given cryptic clues as to the location of the next piece of key. The first of these is quite straight forward, but they seem to get progressively more tricky; but then that is part of the fun of the game.

So that's the point of the game, what about the implementation? I have to say that my initial impression was not good. If you look at games like *Wing Commander* or *Captain Blood* (on other machines) it really looks as if you are sitting in some sort of space vessel. The instrument panel in *Black Angel*, on the other hand, looks more like something Zanussi or Hotpoint would come up with. Apart from the radars, there are only two types of indicator; your entire ship's well being is shown with a collection of green and red dials and a handful of coloured bowties. Each is labelled with a simple two or three letter abbreviation; hardly any effort seems to have gone into creating a dashboard worthy of a ship capable of approaching the speed of light.

Once you've got over this though, the graphics that really matter are very impressive. Just about every object you see is concave and shaded. In simple terms this means they've got sticky-out bits and holes. Many ships seem to have been 'borrowed' from the 'real' world, so watch out for Klingons, The Liberator and HAL. Suns (and stargates) have crinkly edges, planets tend to be plain coloured circles but do have rotating dots on their surfaces to indicate movement.

The mouse controls yaw and pitch, thrust and selected weapon. Roll of your craft is provided with the < and > keys. Flying the ship takes a little getting used to, as you need not necessarily be facing in the direction you are flying. Thrusting off in a different direction will slowly change your flight path, but you will often need to come to a halt to change direction as you expect.

It took me about half an hour to work out what was going on, but then it clicked, and I'm quite impressed with the versatility of movement you get. I'd like to be able to control all movement from the keyboard though, as I often find myself running out of mouse space at some critical point.

Finding the keys maybe the aim of the game, but you've got to survive and pay off the loan it took to buy your ship. To do this you need to upgrade the spec of your craft and get a job, although not necessarily in that order. When you are within teleport range of a world, you can buy employment licences.

Different places offer different jobs, so do look around. You can be anything from a waste disposal operative to a mercenary. The manual does not offer much help on how to start, so I suggest you try being a mining engineer or a parcels courier until you get the hang of flying and shooting, before progressing on to the more tricky armed escort.

Completing a job will increase the size of your bank balance, enabling you to buy a more formidable gun or maybe a tractor beam. There are certainly one or two things not quite up to par in *Black Angel*; most notable the instrumentation, some of 'systems' screens and rather an unhelpful manual. But overall, this is a very challenging game and should keep you amused in these long dark winter nights.



. . . so when you see a Bird of Prey go around for another pass; duck!

HERO QUEST

Krisalis
Tel: (0709) 372290
£29.99
Risc OS machines

At last. One type of game sadly lacking from the Arc repertoire so far has been the RPG, or role-playing game. Enter *Hero Quest*, a conversion admitedly, but a welcome addition to the Risc OS games stable.

Role-playing games are deeply familiar to users of other machines, some of whom remember playing the original *Dungeons & Dragons* with real bits of paper, pens and pencils.

The general idea behind RPGs, which is usually, but not always, set in a sword and sorcery milieu, is that a bunch of characters of varying abilities, in search of loot and glory in that order, roam around some sort of landscape, hack monsters, cast spells, solve puzzles and, of course, collect loot.

What distinguishes an RPG from a text adventure, apart from graphics, is character interaction and a more refined strategy/combat system.

All these elements are present in *Hero Quest*, although it has to be said that the game has a rather strange ancestry. It originated in a successful Games Workshop board game of the same name, which was effectively an entry-level *Dungeons & Dragons*, for those who didn't have the time and money to set up elaborate dungeon quests; I am always being badgered by my 14-year old nephew to join in a *Hero Quest* game.



You can always spot the wizard; he's the one skulking at the back and looking worried

Hero Quest, the computer game, follows almost exactly the same lines as the board game. You can have up to four characters: barbarian, elf, dwarf and wizard, of whom the wizard and elf have the ability to cast spells, the dwarf is good with traps, locked doors and the like, and the barbarian is good at, well, slaying.

Unlike more complex systems, which are rooted more firmly in the original D&D, characters do not have randomly distributed personality attributes: strength; intelligence; charisma and so on. Instead, they have two main characteristics: mind and body points. Of these, the latter is the more important, as if these run out it's death. A key difference is that the characters do not gain experience.

As in any game of this type, the characters do carry gold, and this can be used to buy useful things from the ever-avaricious shopkeeper at the beginning of the quest. These are mostly weapons and armour, which affect the way in which combat is conducted.

No more pussyfooting, the next thing is to dive in at the deep end and choose a quest. There is a selection of 14 getting progressively harder, all of which are linked by the usual rather silly sword and sorcery background story.

Selecting one from the menu means that the wizard and elf can now choose their portfolios of spells. The elf gets only one, while the wizard, lucky dog, gets six spells. Spells can only be used once each, and do not just include combat. They can be used to heal; make characters faster and the like. It's quite important to conserve these for emergencies.

Then into the depths. The dungeon is shown in familiar isometric mode, just as in *Knight Lore* or the like, and a handy map icon is available to show you rooms you've already explored. Baddies are a bit wooden: there is little animation and they mostly just sit there.

Movement is very board-game oriented. You through a dice for each characters movement points and these are used up as they move around or perform any other action, like combat or searching rooms for treasure or hidden doors. It's very important to search everywhere in this game, by the way if you want to get your game bonuses. The combat system, too is board-gamey but easy to use.

It is no criticism of *Hero Quest* to say that it is simplified. However, I can't see veterans of the *Ultima*, *Bard's Tale* or *Beholder* series giving it a second glance; it doesn't offer enough options, objects or mysteries. As an introduction to this game genre, though, I can recommend it.

Fin Fahey



Hardly a consumer paradise, although inflation is zero per cent



QUESTIONS AND ANSWERS

Q I am in my second year of A-level studies at a college that uses *WordStar 6* on PCs for word processing.

When I attempt to transfer a *WordStar* document to *Edit* or *1st Word* on my A3000, a strange thing happens. In *Edit*, all the text is present but it is liberally scattered with strange characters like [00] and [1d], particularly at the start and end of the document.

I've tried clearing them with search and replace but with no success. Can you help me?

R Rowles
Andover

A What you have here is a text file that contains a number of characters with Ascii codes less than 32 (hexadecimal 00 to 1f). In most applications, these 'control characters' perform special functions and are not displayed.

When *Edit* comes across a control character, it shows it as two square brackets enclosing a two-digit hexadecimal Ascii number. For example, CTRL-G, also known as VDU 7 or 'beep', appears as [07]. This is merely the screen representation of a single character; strings like [07] don't actually exist in your text file.

To fix this problem, first make sure that the files that you bring over from *WordStar* are in Ascii format ('text only'). In the best of all possible worlds, this will eliminate all the odd characters.

If, due to incompatibility between packages, some control codes remain, you can change them by using the 'Magic Characters' option in Search. By searching for \x followed by the two digits shown in square brackets you can alter any or all occurrences of a particular code. (for example, for [0d], type \x0d).

Q Would it be possible for you to print a 'core' program that would make it easier to write Basic programs that use the full range of desktop facilities? I mean procedures that would allow you to create your own windows, menus, and so on?

A Keb
Surrey

A What you're asking for is a major series of articles rather than a single example program. I suggest that you read the book, *Wimp Programming for All*, by Lee Calcraft and Alan Wrigley, which was published last year by Risc Developments, which can be contacted on (0727) 40303.

This costs £12.95 and contains many examples of Risc OS desktop programming in Basic. The authors also do a disc with the examples on it for £4.95.

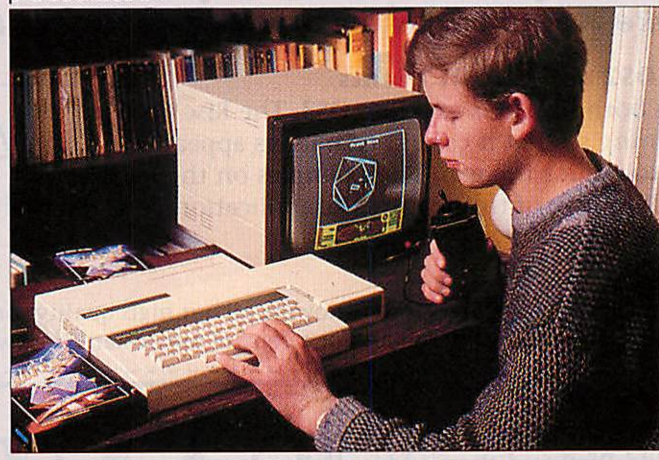
STAR QUESTION

Q I have recently purchased a secondhand Acorn Electron. I was astounded by its capabilities but find that in addition to a disc drive etc. I require a PL1 expansion unit. Perhaps you could tell me where I can buy this unit, secondhand or otherwise?

David J Humphreys
Llandysul, Dyfed

A Given that the Electron was first made in 1984 as a cut-down BBC micro, it's quite astounding how many new users it's got. Almost every month, we get a letter from someone who just bought one in a car boot sale and wants something for it. It might be a disc drive; a printer, or simply more games. As they've been out of production so long, getting hardware and software for Electrons is becoming quite difficult and it often takes a bit of hunting to find what you want. Here's a list of contacts who may be able to help with a variety of problems:

- The Electron User Group, 134 Great Knightleys, Basildon, Essex, SS15 5HQ: help and advice (send SAE)
- PRES Ltd., Box 319, Lightwater, Surrey GU18 5PW (0276 72046)
- Software Bargains & Mercury Games, c/o Northwood House, North Street, Leeds LS7 2AA (0532 436300): Software
- Electron PD, 5 Edward Street, Clifton, Brighouse, West Yorks., HD6 1DA: Public domain software for Electron only (send SAE)
- HeadFirst PD, 97 Chester Road, Southport, PR6 7HH: Some Electron PD
- Slogger Computers, St. Just, Penzance, Cornwall TR19 7RZ: Hardware
- BBC Acorn User: Check the free ads for second-hand Electrons, peripherals and so on.



Devoted users keep the Electron running on and on

Q At our school we have, for several years, been using BBC B and Master computers and have recently taken delivery of some A5000 computers.

Over a period of time we have built up data files on 5¼in floppy discs formatted to 800K (80-track, double sided) using a database Rom called *Star Data Base*. We would now like to transer this information to the A5000.

How do we:

- Transfer data files from 5.25in DFS to 3.5in ADFS format?
- Download the *Star Data Base* program from Rom to disc to enable us to run it on the Archimedes under BBC emulation?
- Transfer data from 5¼in to 3½in in a form which can be read by *Pipedream 4*, our database on the A5000? This last is my preferred option.

G.D. Lambkin
(Deputy Principal)
Bradbury Junior School
Hong Kong

A Your first problem is moving between disc sizes and formats. The first way of doing this is to get an external disc interface for your A5000 and attach a 5.25in disc drive to it. You could then load files from 5.25in DFS discs via a DFS reader program like the one made by Beebug; (0727) 40303.

The second, more expensive, method is to buy a dual standard disc drive (meaning 5.25in and 3.5in in the same box) from Watford Electronics – (0582) 487777 – and connect it to a BBC Master. The Master intro disc already has an ADFS/DFS transfer utility on it.

If you can afford it, I would recommend the second option which commits the less powerful computer to all the boring file transfer work and allows the A5000

to get on with something more interesting.

The second problem is how to get your datafiles into a format that can be read by *Pipedream 4*. I'm not familiar with *Star Database* but, with any ordinary luck, it has the capacity to produce output files in CSV (comma separated variables) or tab-delimited Ascii (TDA) format.

This means that each record can be stored as a line of text terminated by a carriage return with its field contents separated by either commas or tabs. If *Star* can't do this, you could send a printout of your data to file; use a text editor to replace the chunks of blank space with tabs; and then load that as TDA.

In any event, avoid the second option – emulating a BBC micro – like the plague. If there is any way you can get your data into *Pipedream*, do so. There is no point in crippling your A5000 by running ancient 6502 software on it.



The joy of sticks can be yours; but on the A3000 they need the right interface

Q I am thinking about purchasing a joystick interface for my Acorn A3000 and, while I am aware that I will need to buy an interface for it, I am not sure which to get, as there are quite a few different types.

I am considering both the Leading Edge and the RTFM interfaces. Can you tell me about the differences between them? Also, is it possible to connect Sega or Nintendo joypads to these interfaces?

James Sales
Solihull

A **The basic differences between these two are in the ways in which they connect with the machine and the methods used to address software.**

The RTFM device sits in the Econet socket with two joystick inputs mounted on a podule backplate and works with a large number of games that have been adapted for it.

The Leading Edge (Vertical Twist) system sits on the parallel printer port and uses a editable software 'driver' installed in memory to send the appropriate key press instructions to any game even if it's not designed for a joystick. The only games that do not run under this system are those which, on 1Mb machines, grab all the available Ram for themselves and 'kill' the driver in the process.

This discussion may be a little academic, as RTFM have recently gone into liquidation, and you could have difficulty getting hold one of their interfaces firsthand.

You can connect Sega two-button joysticks to Archimedes machines, although only one fire button will operate. The three-button Sega Megadrive sticks won't work, because they require a power supply and Nintendo uses its own weird plugs, which are incompatible with existing Archimedes interfaces.

Q I have a BBC B fitted with a 32016 second processor and a 20Mb hard drive. The documentation supplied frequently makes reference to the *PANOS Technical Reference Manual*. I have made several enquiries, but have yet to find a copy. Where I can obtain one?

I have also been trying to learn C on the 2nd processor and would like to implement single character input functions like GET and INKEY in Basic but everything I try demands a terminating carriage return. I've tried osbyte calls using the BBC module, but I can't make this method work either. Can you help me?

I Barr
Wellingborough

A **PANOS is the operating system that runs your second processor. It's been out of production for some time and I don't know where you'll find the manual but maybe one of our readers can help. If anybody has a copy or knows where one can be found, please write to *BAU* and the information will be passed on.**

Unless your version of C is very unusual, it will have a standard input/output library called stdio or something similar. If you #include this library at the top of your program, you will be able to make use of a number of I/O functions, including getchar() that reads a character at a time from the 'standard input', generally your keyboard.

For more information on stdio functions, read Chapter 7 of *The C Programming Language* by Brian Kernighan and Dennis Ritchie (publisher: Prentice-Hall), the definitive general book on C.

Q I am running a graphics bureau using Archimedes and several of Computer Concept's associated products, and I am thinking of investing in a colour scanner to incorporate photographic images into my work.

I understand that 24-bit colour images take up a great deal of memory and would like to know how to handle them on my Archimedes. Is there a 'virtual memory' approach? Since you produce *BBC Acorn User* on *Impression* and use many colour images, I thought you might know how it's done.

Nick Eltar Eriksen
Denmark

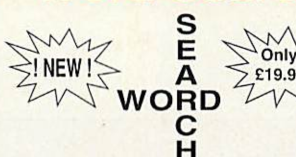
A **The kind of 'colour separation' you're talking about takes up such an enormous amount of memory and processor time that not even an A540 equipped with maximum memory is really up to the job.**





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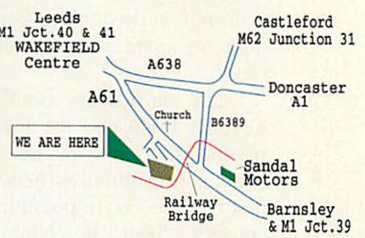
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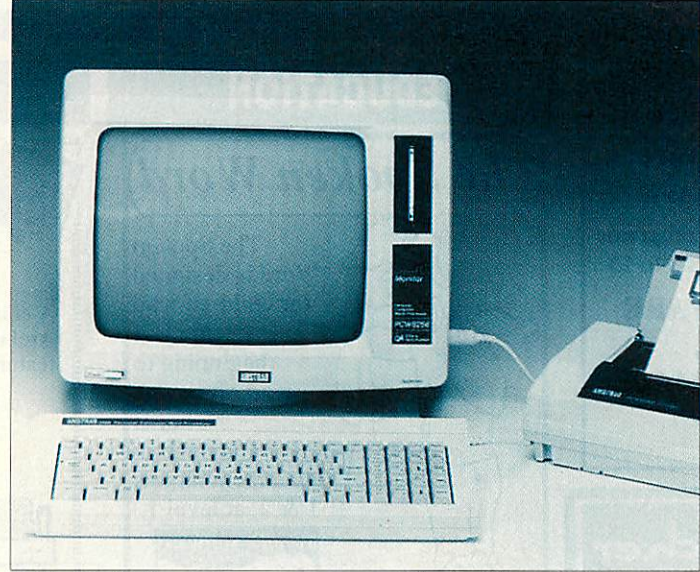




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At *BAU*, the black-and-white editorial page is produced on *Impression 2* while the colour work is laid in at the printers. It may come come as a disappointment but even program screenshots are produced from photos of Taxan monitors.



Not bad for its time: but now you can convert Amstrad files to 32-bit format

Q I would like to upgrade my A3000 to read high-density discs. Is this possible now that Risc OS 3 is here?

A B Summerscales
York

A By the time you read this, it should be possible. Once you have Risc OS 3 on your A3000, you will need a 2Mb high-density drive and an interface card to drive it. Risc OS 3 and the drive alone will not work. This is because the disc control systems in A3000s, A300 and A400 series machines do not support 2HD discs.

The only currently available High Density Interface is the Alpha HDI podule from Arxe Systems (081 534 1198). This is an internal podule for A400/500 series machines, but Arxe hopes to have an external version with disc drive by early 1993.

Alpha HDI can be upgraded to carry a 16-bit SCSI card, which may come as a relief if you're worried about using up the A3000's single podule socket.

Arxe apparently has no immediate plans for an internal high-density disc drive unit on the A3000 but, if enough people ask for one, the company has said it will think about building it.

UPDATE

In November, K Elliot of Orpington in Kent asked us about transferring *Locoscript* files from 3in Amstrad discs to an A3000. Within a week, three readers wrote in to explain how they had managed . . .

A Michael Day of Harrow, Middlesex and Janet Quarton of Lochgilphead, Argyll both use external 3in drives on a BBC B+ and a Master respectively to read Ascii and Locoscript files on to DFS and ADFS formats.

The drives were made by Matmos Ltd and a transfer utility called CP/M-BEEB was made by BAKSoft of Cambridge. Both are out of production, but may be available second-hand.

Jeff Wheatley of Hanworth, Middlesex uses *Kermit* and a serial link to transfer files from a PCW to a *LocoScript* PC (on a PC), that can convert them into other formats and could be passed from PC to Arc on Dos diskettes. A convoluted process, but it works.

CUSTOMER HOT LINE

Every month in BAU, Alan Glover from the Acorn customer service department offers you Acorn's advice and support

TO !BOOT OR NOT TO !BOOT

You may have noticed that the first time you open a directory that contains a number of applications it can take longer than it does on subsequent occasions. This happens because the Filer has to examine each application in that directory to execute the *!Boot* file if one is present and load the sprites for the application (these determine the way it appears on the screen).

The simplest way to reduce this delay is to avoid directories which contain a lot of applications; create new subdirectories and move applications into them. This will also mean that you will have slightly more memory available since every application sprite which has been seen is stored in memory.

!Boot files are not essential; the Filer will automatically load the !Sprites file if a !Boot file is not present. However, when a !Boot file is present it should make sure that it loads the sprites; the Filer will not attempt to load the !Sprites when there is a !Boot file.

Unless you have a need for a !Boot file in any applications you write (typically this involves setting up an Alias$@RunType system variable so that double-clicking a file causes the application to be loaded) you should not create one.

If you have any applications where the sole content of the !Boot file is 'Iconsprites <Obey$Dir>.!Sprites' the !Boot file may safely be deleted. Every unnecessary !Boot file slows up the opening of a directory viewer. Some early virus inoculation programs were offenders in this respect; inoculating an application entailed creating a new !Boot file if one was not present and extending a !Boot file otherwise.

Any of your !Boot files that were created solely to inoculate an application should be deleted; the inoculation only provides a defence against one specific virus, and is useless against the remaining 26 infective 'families'.

However, you should include the line . . .

Iconsprites <Obey$Dir>.!Sprites

in a !Run file, since it is quite possible that an application is being run by a boot sequence before a directory viewer on the application has been opened.

ACORN LISP AND RISC OS 3

Some people have found that running Acorn LISP under Risc OS 3 causes the machine to 'freeze'. This can be avoiding by pressing F12 and typing FX 13,11<Return> before running LISP. To do this automatically you should rename the Lisp file in the Library directory to *Lisp_MC*, and create an Obey file called Lisp which contains:

```
fx 13,11<Return>
/%.lisp_MC<End of file – no Return>
```

ADDING ADDITIONAL FLOPPY DRIVES

The Acorn application note, *Adding External Floppy Disc Drives to the A5000* has now been extended to cover the complete Risc OS range of machines. It describes how to add a second drive to your machine, extra hardware needed – if necessary – and the disc formats supported by Risc OS 2 and Risc OS 3. For more on this subject, read my forthcoming article in the February issue of BAU.

NOTE: A3010/A3020/A4000 owners cannot add a second floppy disc drive to their machine.

USING MICROSOFT WINDOWS 3.0 AND 3.1

Windows 3.1 cannot be run under the PC Emulator since it is optimised for an 80286 processor (the PC Emulator is based on the 8088 processor). However Windows 3.0 can be used on PC Emulator version 1.6 and above. The only solution at present is to use a hardware PC card such as the Aleph One 386 or 486 cards.

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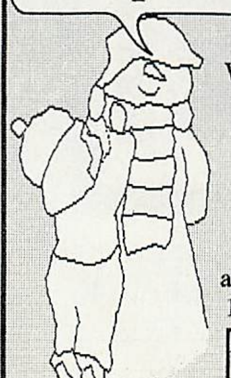
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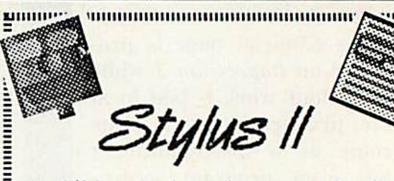
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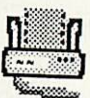
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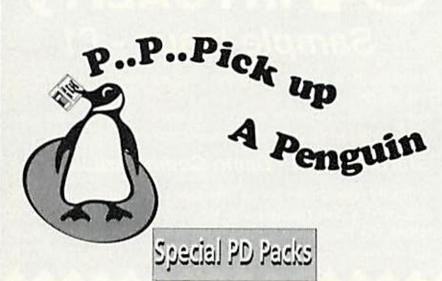
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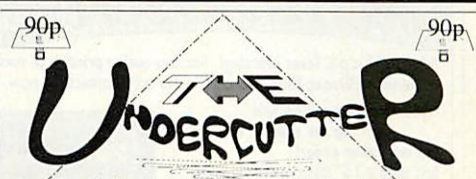
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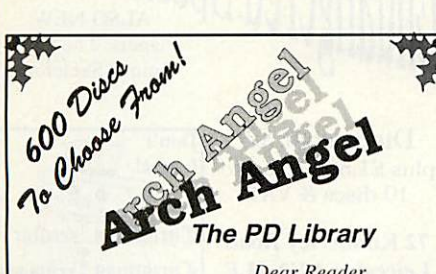


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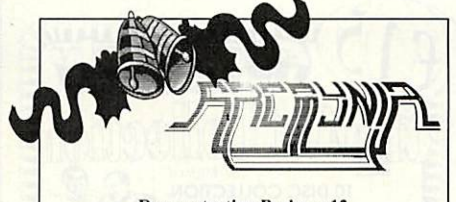


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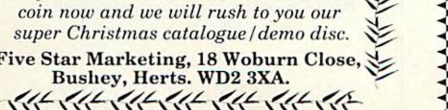


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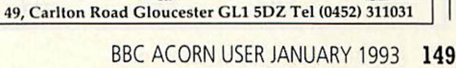
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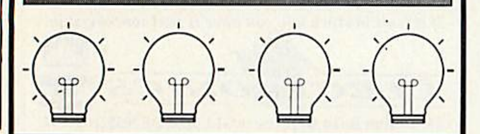
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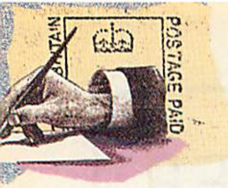
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ACORN USER ADVERTISEMENT PAGES – JANUARY 1993



£15 STAR LETTER

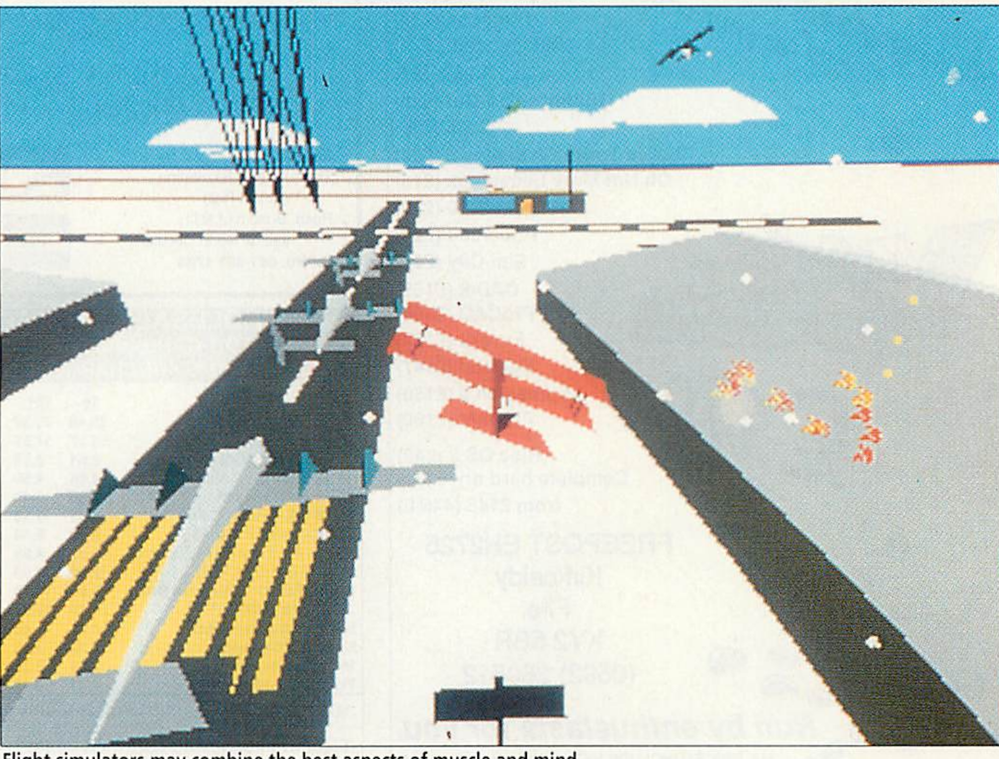
After reading December's games issue I wonder if you could you give me a few pointers on games for our children – mostly lads – who attend the after school computer club. While I am, in terms of your questionnaire a (C) category games player, most of the boys are category (A); they bite the heads off live lemmings.

Are there any good compromise games? A sort of *Omar Sharif Attacks the Last Ninja with a Really Wicked Grand Slam in his Bridge Compendium*?

Christopher Price
IT Co-ordinator
Merton Court School

What about a flight simulator such as *Chocks Away* or *Chopper Force* (reviewed in this month's Game Show)? Flight sims call for a degree of strategic skill, thus keeping the grey matter occupied, but they also rely on a certain killer instinct as you zap those enemies from the sky, or even blow up unsuspecting sheep on the ground below.

For more details of flight sims – and there are several around – check our Armchair Action article in the games issue or watch our regular games reviews.



Flight simulators may combine the best aspects of muscle and mind

CHESSED OFF

As a regular reader, a great fan of *Acorn User* and the author of *Cyber Chess,* I feel I must respond to your review of the program (*BAU* October 1992).

Despite the fact that the *Cyber Chess* package requires a 50-page manual to describe its facilities, as it is a 'game' it was given a short 400-word review. Although this is understandable, it meant that most of the features were simply not mentioned. The problem was compounded by the fact that over half of the available word space was used to detail a somewhat arbitrary test of its chess strength.

Although this is clearly no fault of the reviewer or yourselves, this test was flawed by the fact that the version available in the shops when the review was published (version 1.24) was not the version used in the test (version 1.02). Version 1.24 is substantially stronger at chess than the original. A free upgrade is available by returning the disc to Fourth Dimension. Both versions play chess at high club standard when in 'full strength' mode.

Cyber Chess has more features than almost any other chess program for any other microcomputer (including IBM PCs, Apple Macs and Commodore Amigas) and this is coupled with a chess algorithm that will resoundingly beat 95 percent of its potential purchasers at fast-time controls. It also has a front-end which us considered near-perfect in terms of graphics, design and Risc OS compliancy. Some of the *Cyber Chess* facilities are unique to the Archimedes.

It is also the only chess program I have come across, on any platform, which has any form of perspective scaling. The high clarity two-dimensional board exists for the minority of users who prefer it.

William Tunstall-Pedoe
Cambridge

VAT'S THE MATTER?

In response to Mr Bignell's concerns about accounts software, perhaps he may like to consider *Micro Trader*, which is the longest running business accounts software for Acorn machines.

Mr Bignell correctly states that he should consider an accounting program that has been examined by a VAT officer. *Micro Trader* has been examined and passed as suitable for the VAT accounting requirements and has held this approval since 1984. It is not surprising that Mr Bignell's local VAT office is not aware of this approval as the details are held by the VAT office which issues that approval.

An additional point is that *Micro Trader* also now complies with the new VAT return and EC Sales Listing (ESL). We will be happy to provide further details on request; telephone us on (0276) 472046.

John Huddleston
PRES Ltd

SEIZE THE TIMES

As the author of the Archimedes front-end software for the Times/Sunday Times CD Rom I would like to comment on your recent CD-Rom coverage (November 1992). Towards the end of a positive review of this package the author regretted that the *Times/ Sunday Times* CD-Rom was the only newspaper-based Rom that he had the chance to see and then stated that the comments made about this particular CD-Rom apply to all the others.

In this statement he is mistaken. While it is true that other newspaper CD-Roms may be used on the Archimedes, they may only be run under PC emulation.

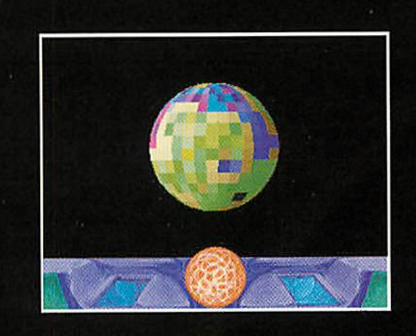
The front-end software for the *Times/Sunday Times* CD-Rom allows many operations to take place on the data that cannot be carried out under Dos. All the text and pictures are exportable using standard Acorn methods; it is fully multitasking and runs at an impressive speed.

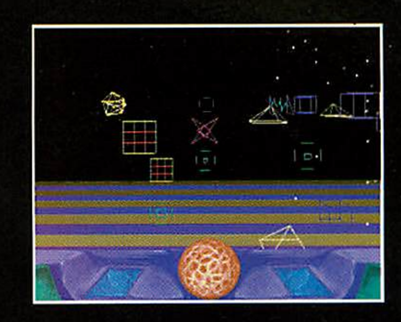
For example, a search within the test for all articles containing the words 'John Smith' takes three seconds and discovers 548 articles. Under the PC emulator the same search takes 23 seconds.

Steve Holroyd
Hampshire county council

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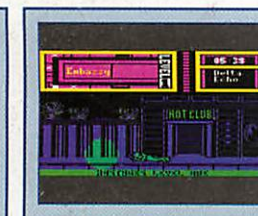
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